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NAVAL POSTGRADUATE SCHOOL MONTEREY CA
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1. REPORT NUMBER		2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) INVESTIGATION OF WELDING THERMAL STRAINS IN HIGH STRENGTH QUENCHED AND TEMPERED STEEL		5. TYPE OF REPORT & PERIOD COVERED THESIS	
7. AUTHOR(s) LIPSEY, MARK D. Lipsey		8. CONTRACT OR GRANT NUMBER(s) Master's thesis	
9. PERFORMING ORGANIZATION NAME AND ADDRESS MASS. INST. OF TECHNOLOGY 12132		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS NAVAL POSTGRADUATE SCHOOL CODE 031 MONTEREY, CALIFORNIA, 93940		12. REPORT DATE JUN 78	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) LEVEL		13. NUMBER OF PAGES 130	
		15. SECURITY CLASS. (of this report) UNCLASS	
16. DISTRIBUTION STATEMENT (of this Report) APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED		18a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
19. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) WELDING THERMAL STRAINS; THERMAL STRAINS; QUENCHED AND TEMPERED STEEL			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) SEE REVERSE.			

**INVESTIGATION OF WELDING THERMAL STRAINS
IN HIGH STRENGTH QUENCHED AND TEMPERED STEEL**

by

MARK D. LIPSEY

Submitted to the Department of Ocean Engineering on May 12, 1978 in partial fulfillment of the requirements for the Degree of Ocean Engineer and to the Department of Materials Science and Engineering on May 12, 1978 in partial fulfillment of the requirements of the Degree of Master of Science in Materials Engineering.

ABSTRACT

Previous studies of transient thermal strains during welding of high strength quenched and tempered steels are discussed. Data on the transient strain and temperature response during welding experiments on HY-130 and low carbon steel are presented. The experiments consisted of unrestrained, multipass, butt welds in one inch thick plates.

The experimental results are compared to analytical predictions by the MIT computer program for the one dimensional analysis of thermal stresses and metal movement during welding. Results indicate that the program accurately predicts the temperature distribution present during welding. However, the program fails to accurately predict the transient strain response except far from the weld line where transverse strains are insignificant. Therefore, the one-dimensional program has limited usefulness for predicting response in thick sections.

Recommendations are made which include a comparison of results with a two-dimensional computer analysis and a metallurgical characterization of both the weld metal and the base metal near the weld.

Thesis Supervisor: Koichi Masubuchi

Title: Professor of Ocean Engineering and Materials Science

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INVESTIGATION OF WELDING THERMAL STRAINS
IN HIGH STRENGTH QUENCHED AND TEMPERED STEEL

by

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B.S., Metallurgy and Materials Science
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(1970)

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
DEGREE OF
OCEAN ENGINEER
AND FOR THE DEGREE OF
MASTER OF SCIENCE IN MATERIALS ENGINEERING

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
June, 1978

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Accepted by.
Chairman, Department Committee on Graduate Students

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1978

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ACKNOWLEDGEMENTS

I wish to thank many individuals at MIT who were of great assistance to me in my thesis research. Mr. Fred Merlis of MIT's Aerolastic Laboratory, Mr. Anthony Zona of the Materials Joining Laboratory, and Mr. Robert Huston of the Materials Processing Laboratory were especially helpful in the preparation and conduct of my welding experiments, and special thanks goes to Professor Koichi Masubuchi for his advice and support of my work. I am also indebted to Mr. Ivo Fioretti of the Naval Ship Engineering Center and Mr. Jim Peck of Mare Island Naval Shipyard for providing the material necessary for my research.

Finally, I thank Ms. Debbie Schmitt for her great perception and perseverance in typing this thesis.

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CHAPTER I
INTRODUCTION

A. Background

Welding is the most widely used form of joining in the fabrication of marine structures. It is used almost exclusively in the fabrication of naval vessels for welding offers many advantages over other forms of joining. These advantages include a reduction in structural weight, an increase in structural strength, and ease of attaining air and water tightness. However, welding does suffer from a few disadvantages which derive from the local heating which occurs during the welding process. Complex thermal stresses which occur during welding may cause cracking and mismatching. High tensile residual stresses near the weld may promote fracture and fatigue crack propagation. Distortion and compressive residual stress may reduce the buckling strength of structural members.

For many years the development of high strength steels for use in submarines and deep diving submersibles has been pursued in order to lower structural weight, provide for an increase in depth, and to improve the safety characteristics of submersibles. The direction this development has taken is toward the use of quenched and tempered steels. By use of proper production procedures,

it is possible to achieve high strength levels as well as superior fracture toughness behavior in quenched and tempered steels. These two characteristics make the development of quenched and tempered steels highly desirable.

Since the mechanical properties of quenched and tempered steels are mainly derived from the heat treatment applied during production, it follows that the heat input which occurs during welding will have a large effect on the properties of the plate near the weld. The structure of the quenched and tempered steel will give rise to highly complex thermal strains near the weld. The exact nature of these strains is not well understood, but the ability to analytically predict the mechanical behavior of the weldment in these complex steels will avoid the huge costs of money, time, and manpower which would be required to empirically generate the data necessary to predict and avoid problems in all stages of fabrication. The key to analytically predicting and avoiding problems during the later stages of fabrication is to develop the ability to predict residual stresses and distortion resulting from welding. The most reliable method of achieving this aim is to accurately predict the thermal strains which occur in the metal near the weld line

during the entire welding process.

B. Previous Work in Welding Analysis

The passage of a welding arc induces the formation of complex stresses and strains in the base metal near the weld line. This phenomenon is primarily due to the nature of the heat source in that a welding arc causes not only local heating but this local heating source is constantly moving. Therefore, the temperature distribution in the metal is non-uniform and it is this non-uniformity of temperature distribution which causes thermal strains to develop and change during the welding process. At the conclusion of welding, residual strains and stresses will remain in the metal.

The formation of thermal strains and stresses near the weld line in a low carbon steel, which is due to the passage of the welding arc, is best described by Masubuchi [10] and is repeated here.

"Figure 1 shows schematically how residual stresses are formed in a weld. Figure 1a shows a bead-on-plate weld in which a weld bead is being laid at a speed v . O - xy is the coordinate axis; the origin, O , is on the surface underneath the welding arc, and the x direction lies in the direction of welding.

Figure 1b shows temperature distribution along several cross sections. Along Section A-A, which is ahead of the welding arc, the temperature change due to welding, ΔT , is almost zero (Figure 1b-1). Along Section B-B, which crosses the welding arc, the temperature distribution is very steep (Figure 1b-2). Along Section C-C, which is some distance behind the welding arc, the distribution of temperature change is as shown in Figure 1b-3. Along Section D-D, which is very far from the welding arc, the temperature change due to welding again diminishes (Figure 1b-4).

Figure 1c shows the distribution of stresses along these sections in the x direction, σ_x . Stress in the y direction, σ_y , and shearing stress, τ_{xy} , also exist in a two-dimensional stress field.

Along Section A-A, thermal stresses due to welding are almost zero (Figure 1c-1). The stress distribution along Section B-B is shown in Figure 1c-2. Stresses in areas underneath the welding arc are close to zero, because molten metal does not support loads. Stresses in areas somewhat away from the arc are compressive, because the expansion of these areas is restrained by surrounding areas that are heated to lower temperatures. Since the temperatures of these areas are quite high and the yield strength

of the material is low, stresses in these areas are as high as the yield strength of the material at corresponding temperatures. The amount of compressive stress increases with increasing distance from the weld or with decreasing temperature. However, stresses in areas away from the weld are tensile and balance with compressive stresses in areas near the weld. In other words,

$$\int \sigma_x \cdot dy = 0$$

across Section B-B. Thus, the stress distribution along Section B-B is as shown in Figure 1c-2.

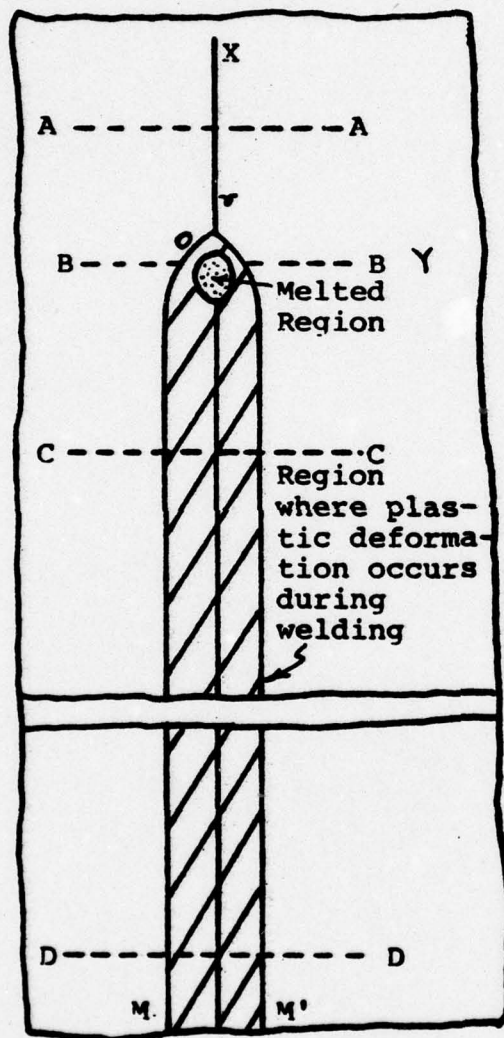
Stresses are distributed along Section C-C as shown in Figure 1c-3. Since the weld-metal and base-metal regions near the weld have cooled, they try to shrink causing tensile stresses in areas close to the weld. As the distance from the weld increases, the stresses first change to compressive and then become tensile.

Figure 1c-4 shows the stress distribution along Section D-D. High tensile stresses are produced in areas near the weld, while compressive stresses are produced in areas away from the weld. The distribution of residual stresses that remain after welding is completed is shown in the figure.

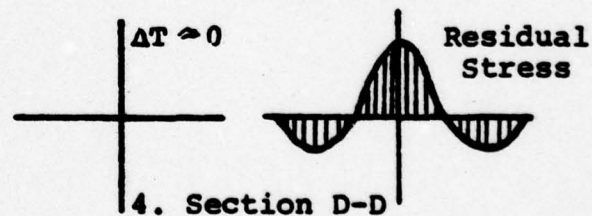
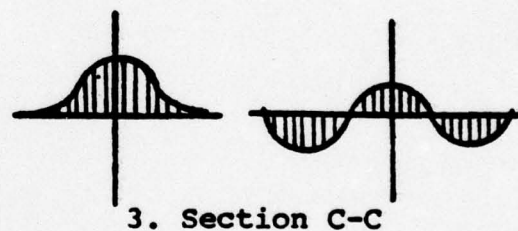
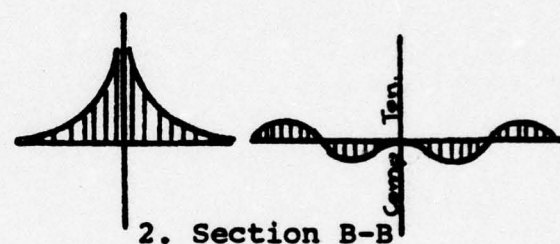
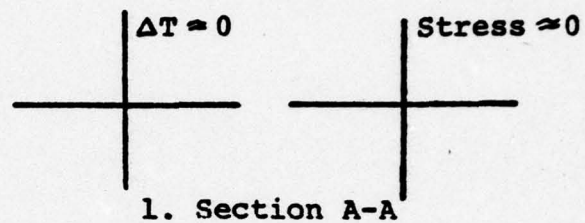
The cross-hatched area, MM', Figure 1a shows the region where plastic deformation occurs during the welding thermal cycle. The cross-hatched area near the origin O indicates the region where the metal is melted. The region outside the cross-hatched area remains elastic during the entire welding thermal cycle."

In the past twenty years, a number of research programs have been directed toward the development of analytical methods of analyzing the formation of these transient thermal strains and the resultant residual stresses and strains in weldments. In 1961, Tall [15] developed a simple computer program in the first significant attempt to use a computer in the analysis of thermal stresses during welding. In his study, temperature distribution was treated as a two-dimensional heat conduction problem but longitudinal stress, in the direction of the weld line, was assumed to be a function of the transverse distance only. Transverse stress and shear stress were assumed to be zero. This type of analysis was designated one-dimensional.

In 1968, Masubuchi, et.al. [11] further developed the above technique to handle thermal stresses in bead-on-plate welding. At MIT in 1970, Masubuchi [2] again improved the one-dimensional program. Later, Bryan [3] modified the



a. Weld



b. Temperature Change

c. Stress σ_x

Figure 1 - Schematic Representation of Changes in Temperature and Stress During Welding

program so that different materials could be analyzed. Provisions for multipass welding and heat losses from the surface were then incorporated into the program.

C. Previous Work on High Strength Steels

At MIT, study of thermal stresses resulting from welding of high strength steels has been done in two programs. Most recently, Hwang [6] studied transient thermal strains during welding and residual stresses in high strength steels. This work complemented that reported by Klein [7,8] on transient thermal strains resulting from welding high strength marine steels.

Klein's study [7] of transient thermal strains concentrated on the quenched and tempered marine steels, HY-80 and HY-130. HY-80 specimens were 1/4 inch thick and 3/4 inch thick and were welded bead-on-plate. The HY-130 specimens were 3/4 inch thick and were multipass butt welded. Strain changes were measured on the specimen surface by electric resistance strain gages and temperature on the surface was measured by adhesive bonded thermocouples. The analytical predictions for HY-80 steel did not agree closely with experimental results. The results of multipass welding of HY-130 showed sudden strain changes which occurred following the passage of the welding arc.

It has been speculated that these sudden strain changes may have been due to phase transformations occurring during cooling of the base metal. Another result was that the strains observed near the weld line decreased as the strength level of the base metal increased.

D. Aim and Purpose of Present Study

Most experimental work to date concerning transient thermal strains and stresses has been concentrated on single pass welding of thin plates. Where multipass welding has been studied, specimen plate thicknesses have not exceeded 3/4 inch. Because of this, it has not been adequately determined whether the computer programs developed to analytically predict thermal stresses and strains during welding are accurate for thicker sections.

The quenched and tempered steel to be used in future U.S. Navy submarines and deep-diving submersibles is HY-130. In order to achieve safe and efficient fabrication procedures for this steel, it is necessary to understand the formation of transient thermal strains during welding in order to be able to predict the residual stresses present after welding. Experimental data on transient thermal strains in thick plates of HY-130 are not extensive and further experiments to generate more data are needed to

increase the existing store of knowledge.

Therefore, the primary purpose of this investigation is to generate experimental data on transient thermal strains during welding of thick sections of HY-130 and low carbon steel. Experiments will consist of unrestrained butt welding by the multipass gas-metal-arc process.

Objectives of the experimental program include:

- (1) to verify previous experimental results on HY-130.
- (2) to determine the applicability of the MIT one-dimensional computer program to multipass welding of thick sections.
- (3) to provide useful information for the modification of the present program as well as for the development of more practical computer programs.

CHAPTER II

MATERIAL CHARACTERISTICS

The material chosen for this study is a high strength quenched and tempered steel which exhibits a minimum yield stress of 130 ksi. This steel has been developed by the U.S. Navy for use as hull plating and structural members in deep diving submersibles, and is designated HY-130. In addition to the extremely high yield stress, this steel exhibits very good energy absorption characteristics at low temperatures. The chemical composition of HY-130 quenched and tempered steel is presented in Table I. The mechanical properties of HY-130 in the "as received" condition are presented in Table II.

One test specimen was a low carbon steel with a designation 1020. This steel was chosen in order to provide further data on another material for use in validating and improving the MIT one-dimensional computer program. The nominal chemical composition of this steel and its mechanical properties are listed in Table III and Table IV respectively.

In order to analytically study the heat flow and thermal strains which occur during the welding process, it is necessary to know the physical and mechanical properties of the metal as a function of temperature, from room

TABLE I
COMPOSITION OF HY-130

<u>Element</u>	<u>Weight Percent</u>
Ni	4.75 - 5.25
Cr	0.40 - 0.70
Mn	0.60 - 0.90
Si	0.20 - 0.35
Mo	0.30 - 0.65
V	0.05 - 0.10
C	0.08 - 0.12
P	0.010 maximum
S	0.015 maximum
Ti	0.02 maximum
Cu	0.25 maximum
Fe	Remainder

TABLE II
MECHANICAL PROPERTIES OF HY-130

Yield Stress	145 ksi
Tensile Stress	147 ksi
Elongation in 2 inches	20%
Reduction of Area	69%
V-Notch Requirements	60 ft-lbs at 70°F and 0°F

TABLE III
COMPOSITION OF 1020 STEEL

<u>Element</u>	<u>Weight Percent</u>
C	.18 - .23
Mn	.30 - .60
P	.04 maximum
S	.05 maximum
Fe	Remainder

TABLE IV
MECHANICAL PROPERTIES OF 1020

Yield Stress	48 ksi
Tensile Stress	65 ksi
Elongation in 2 inches	36%
Reduction of Area	59%

temperature through melting temperatures. For most metals this information is not readily available and for HY-130 no systematic study has been made to determine these physical and mechanical properties at elevated temperatures. However, in his study of fracture of welds of HY-130, Schrodtt [13] developed curves for the physical and mechanical properties of HY-130 as functions of temperature which he derived from data published in References [1,5,9, 12, and 16]. At the present time, these curves are the most valid approximations for the properties at elevated temperatures which are available. The mechanical and physical properties of HY-130 as functions of temperature are presented in Figures 2-7. These physical and mechanical properties for 1020 steel can be found in the literature [4] and are presented as functions of temperature in Figures 8-13.

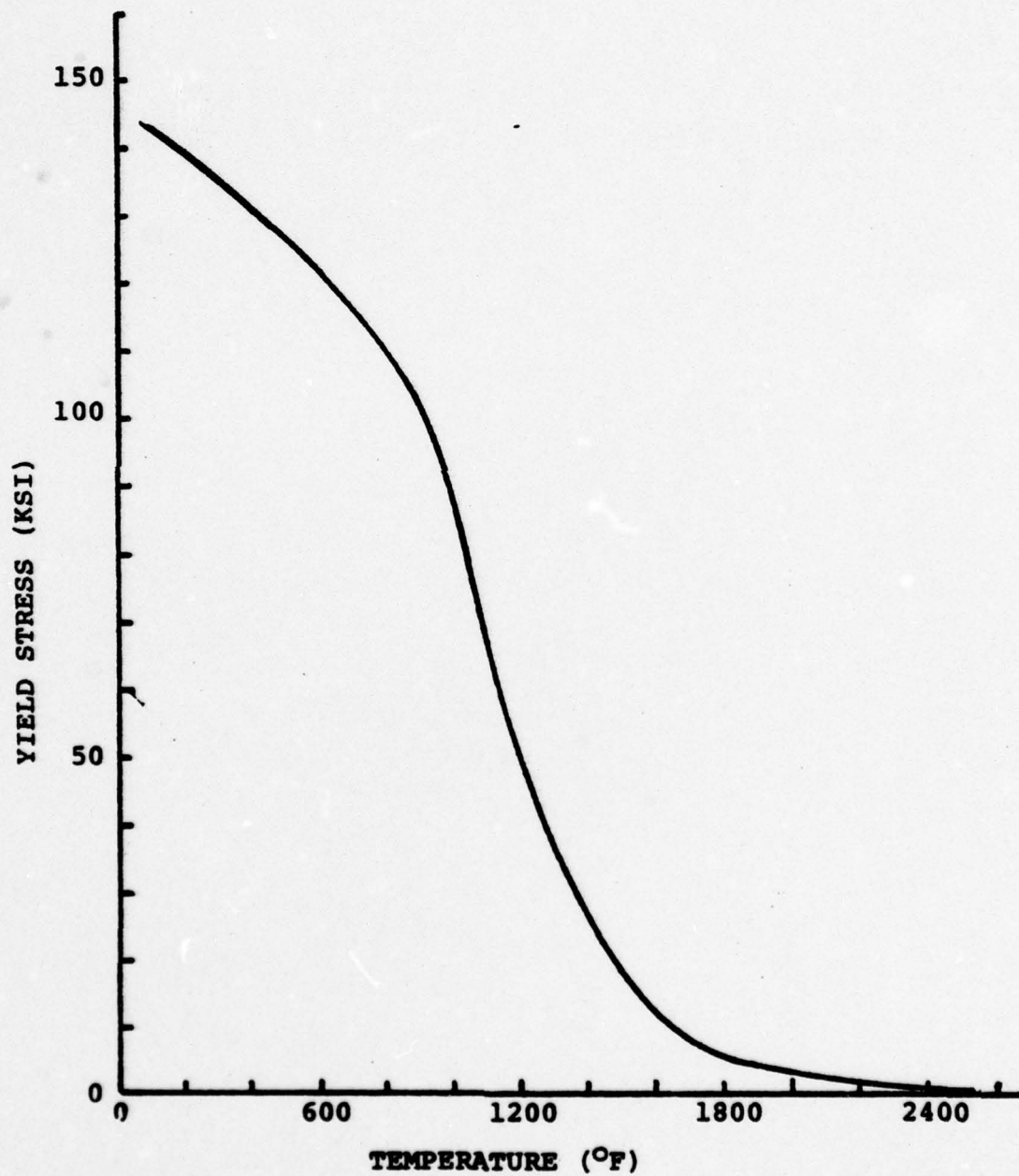


Figure 2 - Estimated Effect of Temperature on 0.2% Offset Yield Stress for HY-130

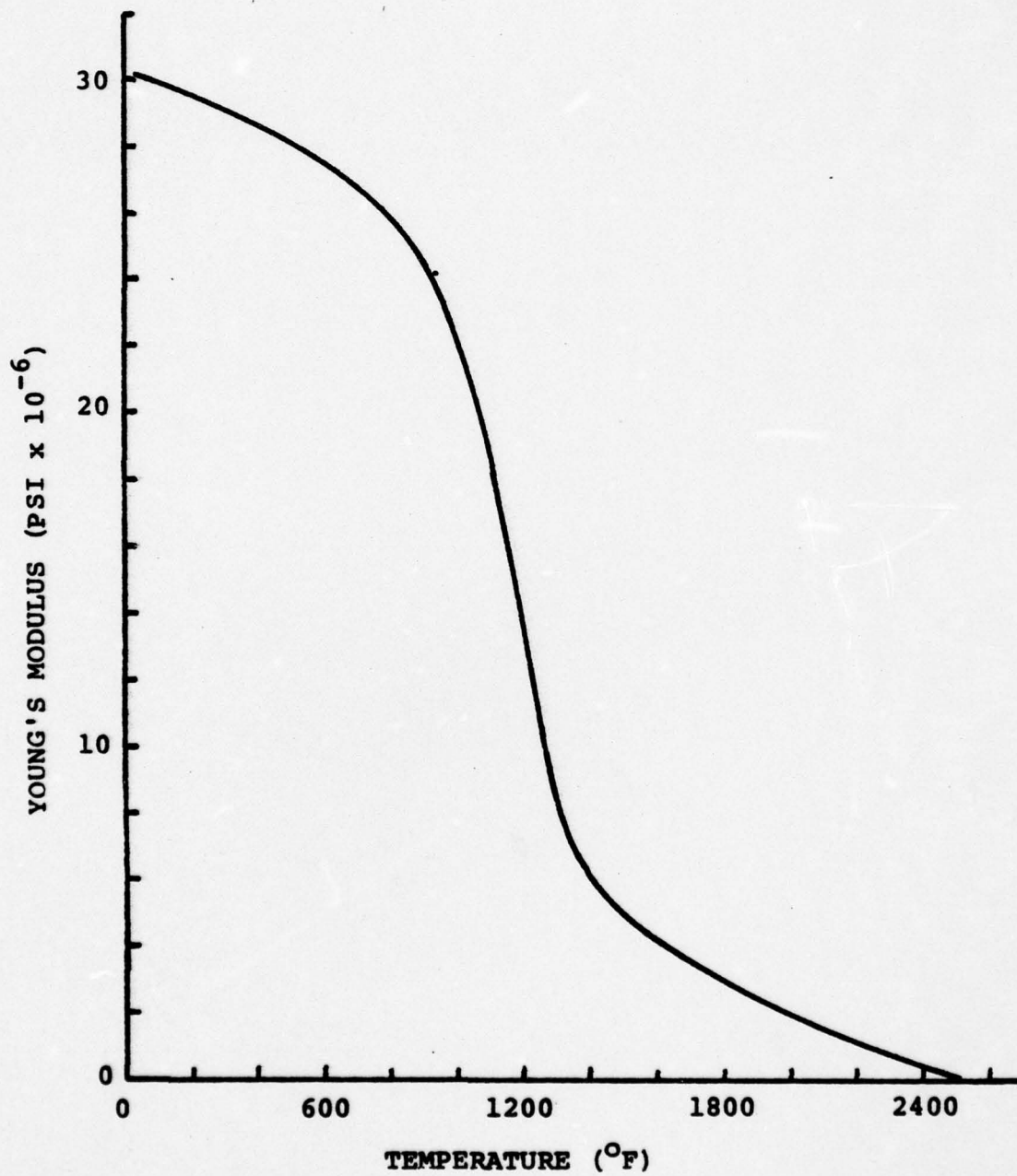


Figure 3 - Estimated Effect of Temperature on Young's Modulus for HY-130

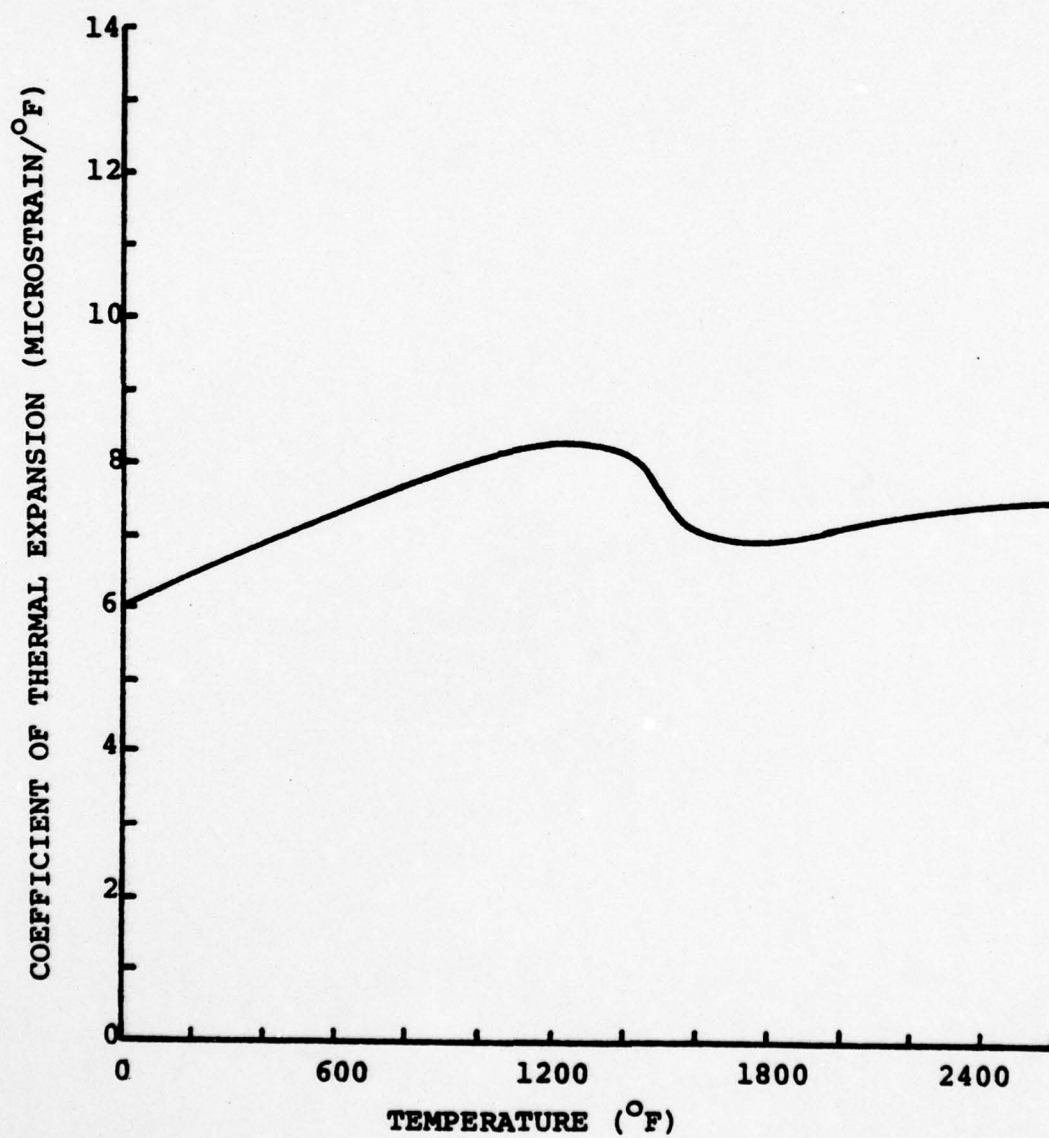


Figure 4 - Estimated Effect of Temperature on the Coefficient of Thermal Expansion for HY-130

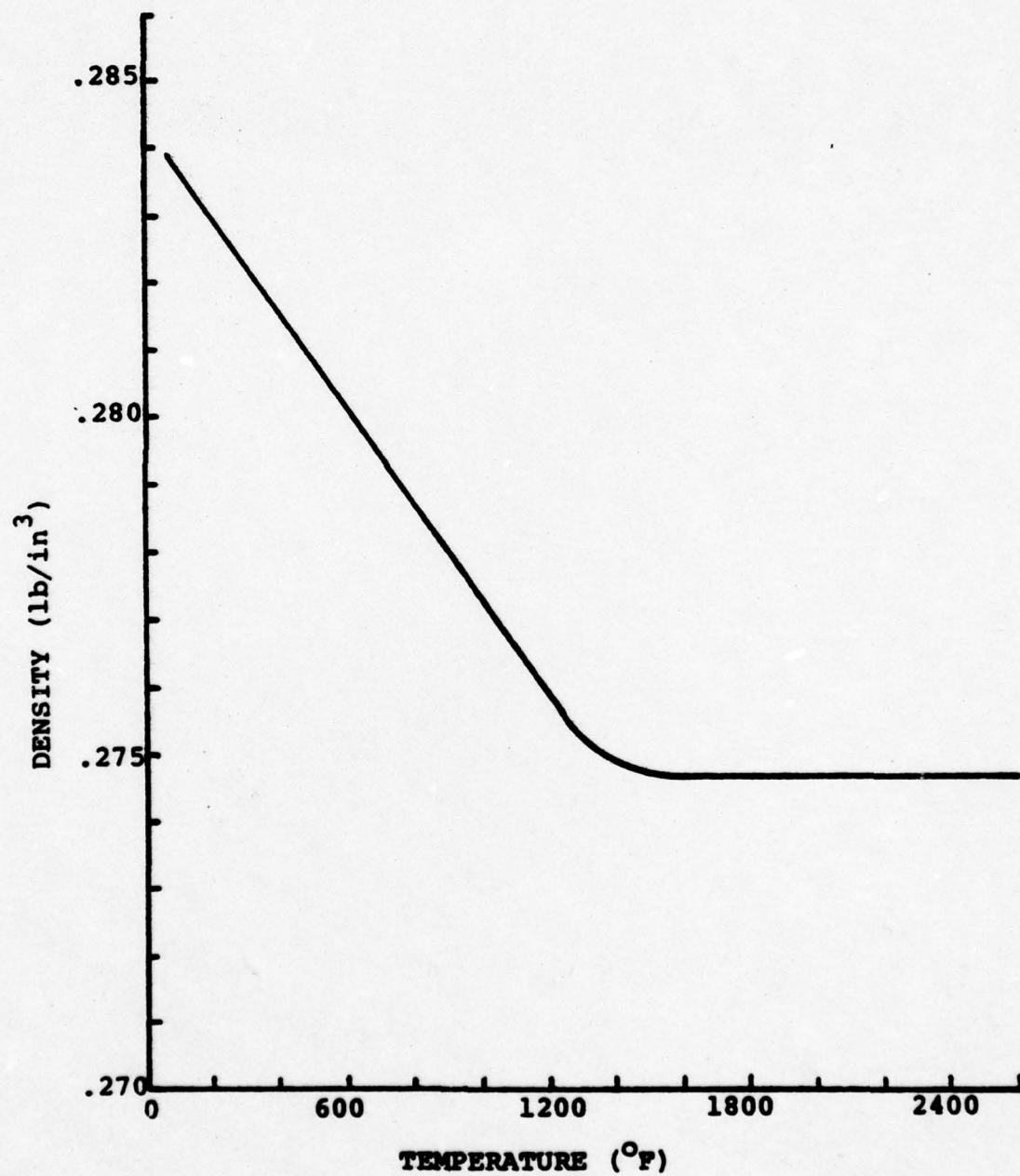


Figure 5 - Estimated Effect of Temperature
on Density of HY-130

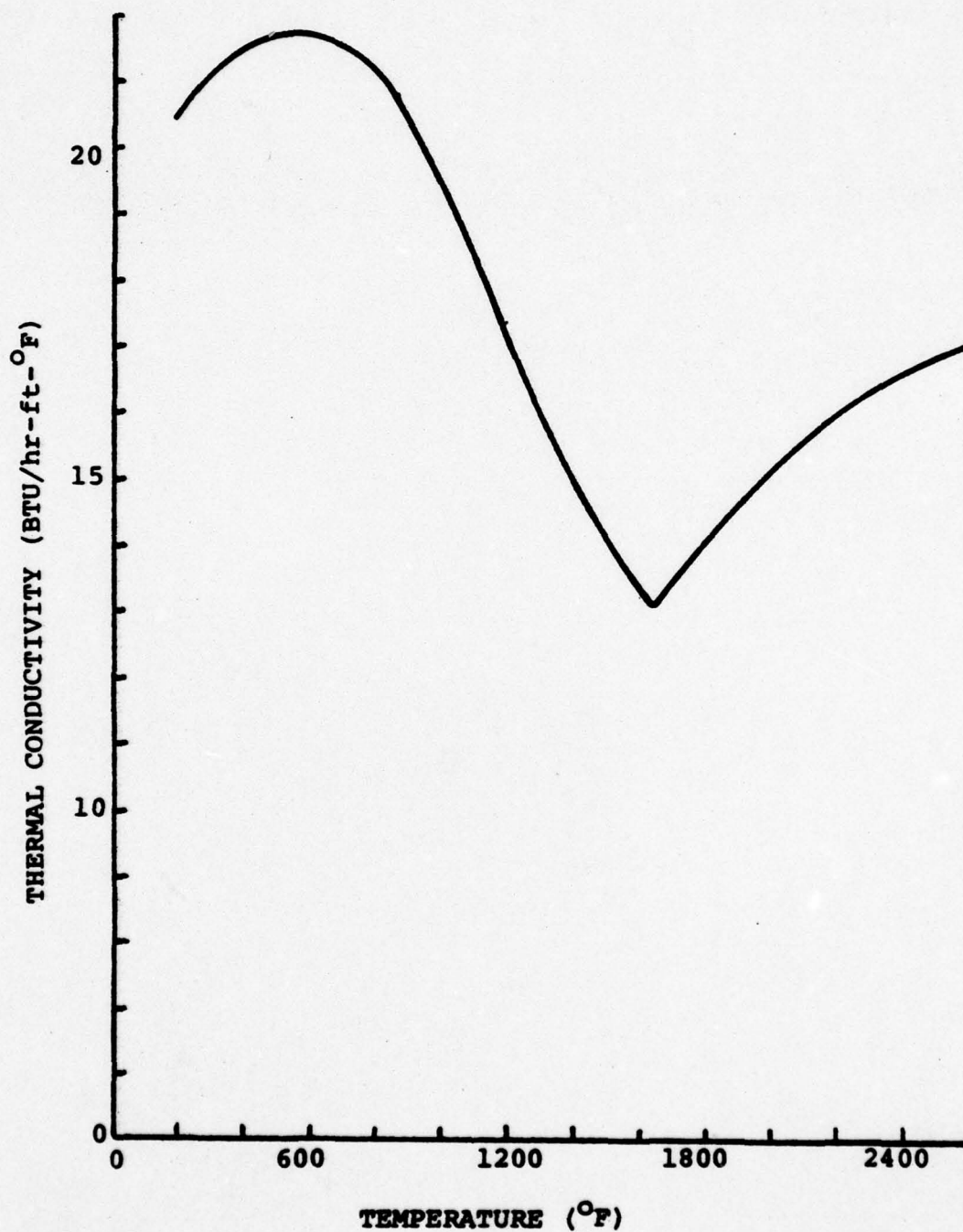


Figure 6 - Estimated Effect of Temperature
on the Thermal Conductivity of HY-130

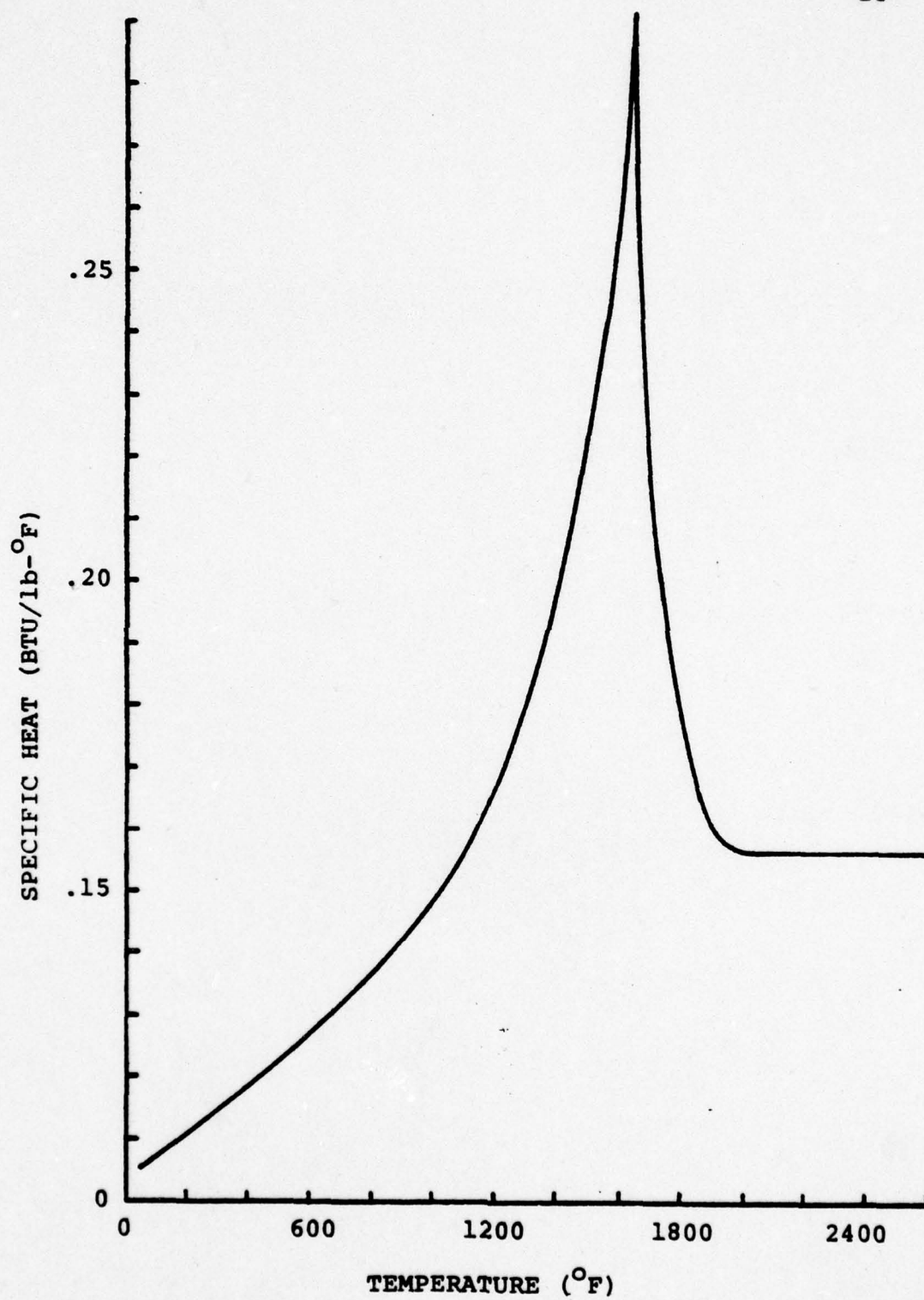


Figure 7 - Estimated Effect of Temperature
on Specific Heat of HY-130

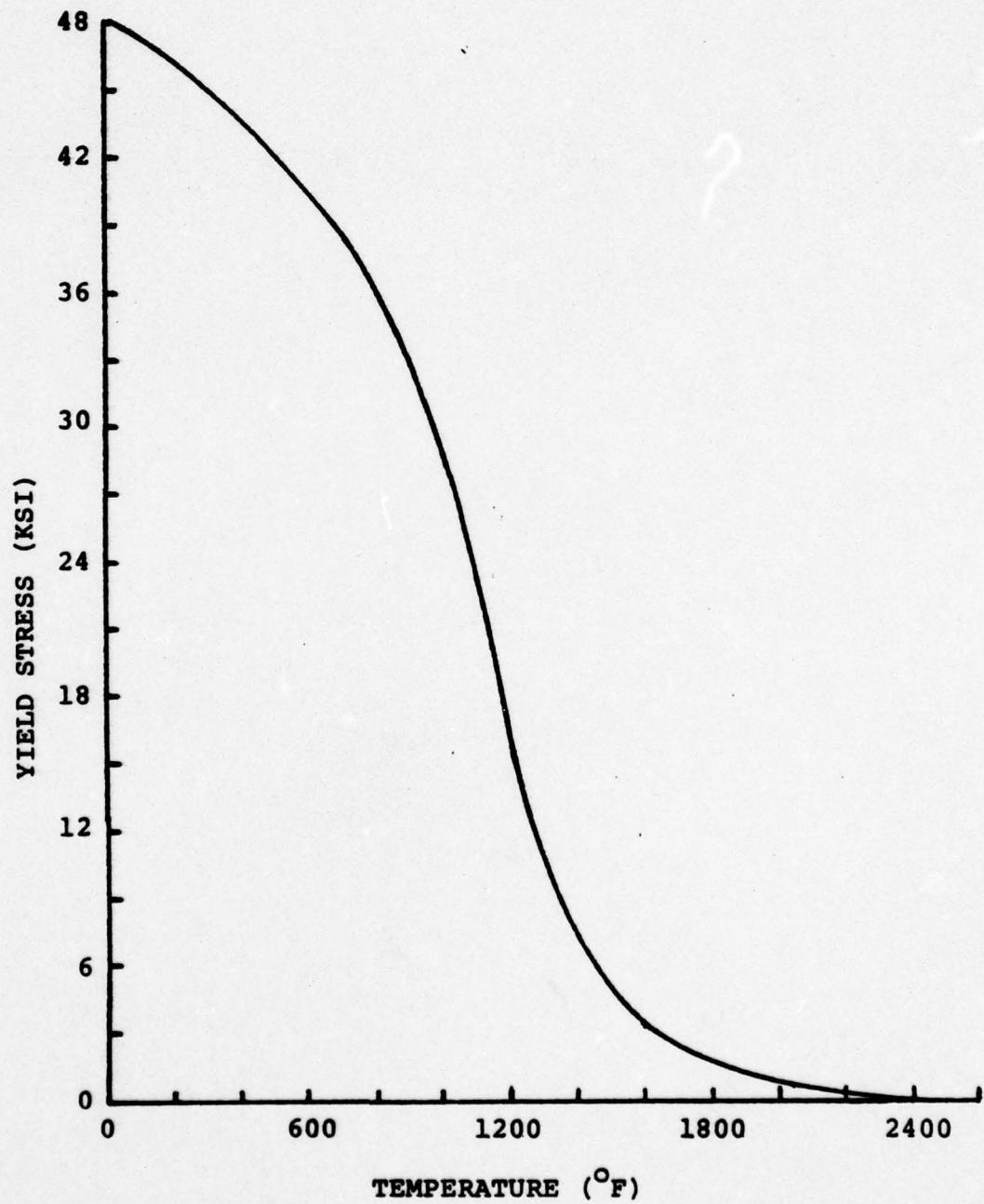


Figure 8 - Estimated Effect of Temperature on 0.2% Offset Yield Stress for 1020 Steel

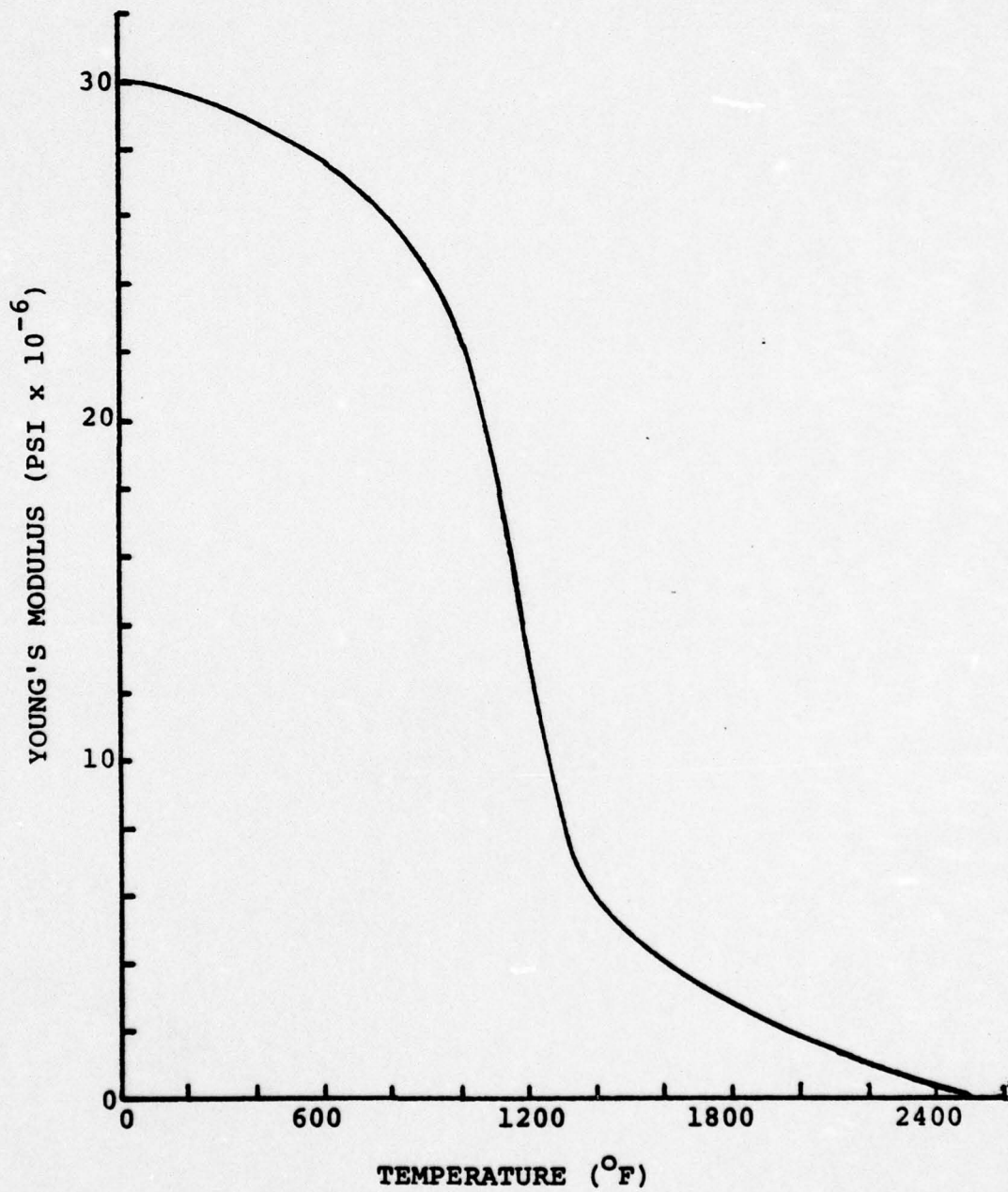


Figure 9 - Estimated Effect of Temperature
on Young's Modulus for 1020 Steel

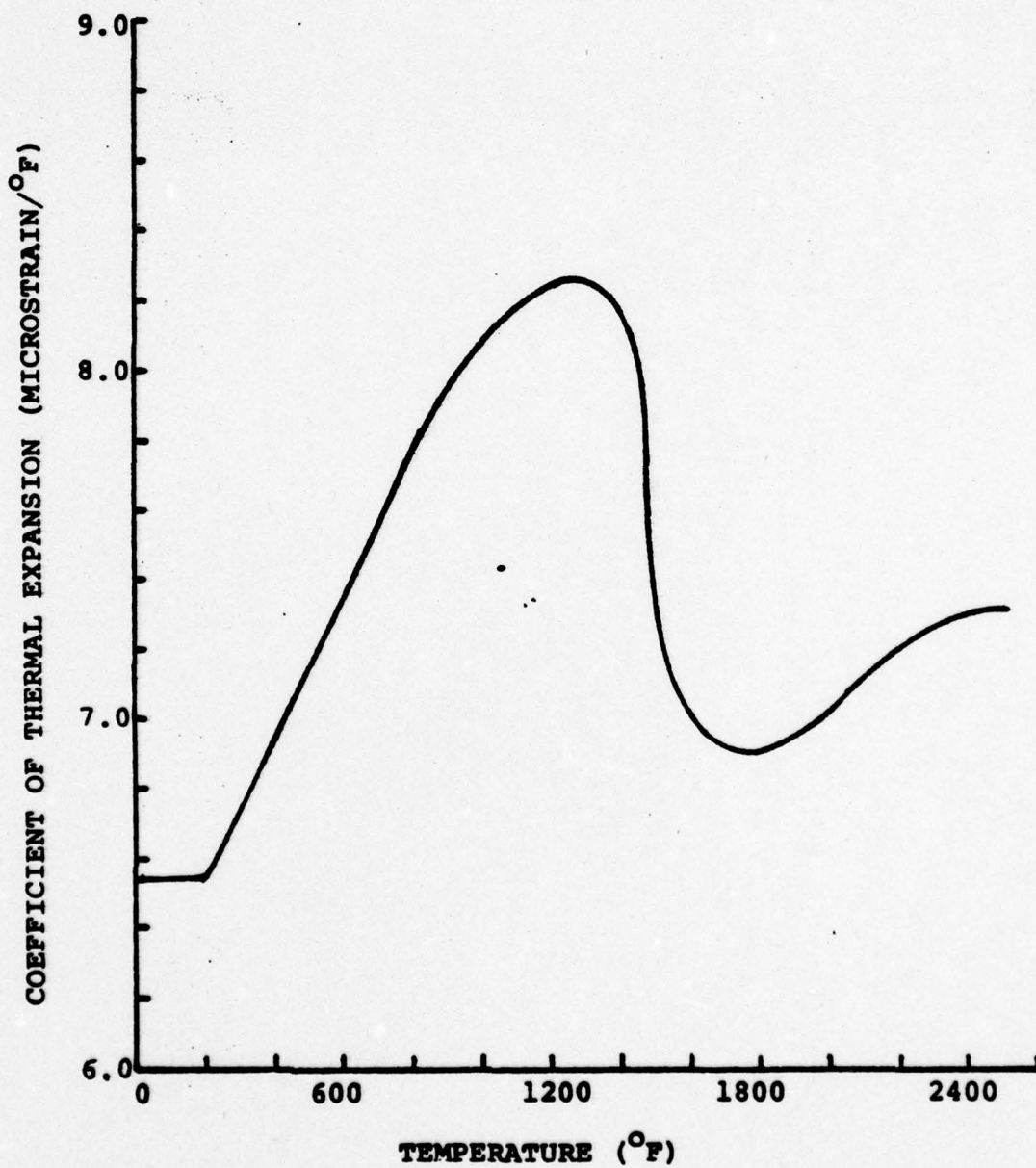


Figure 10 - Estimated Effect of Temperature on the Coefficient of Thermal Expansion for 1020 Steel

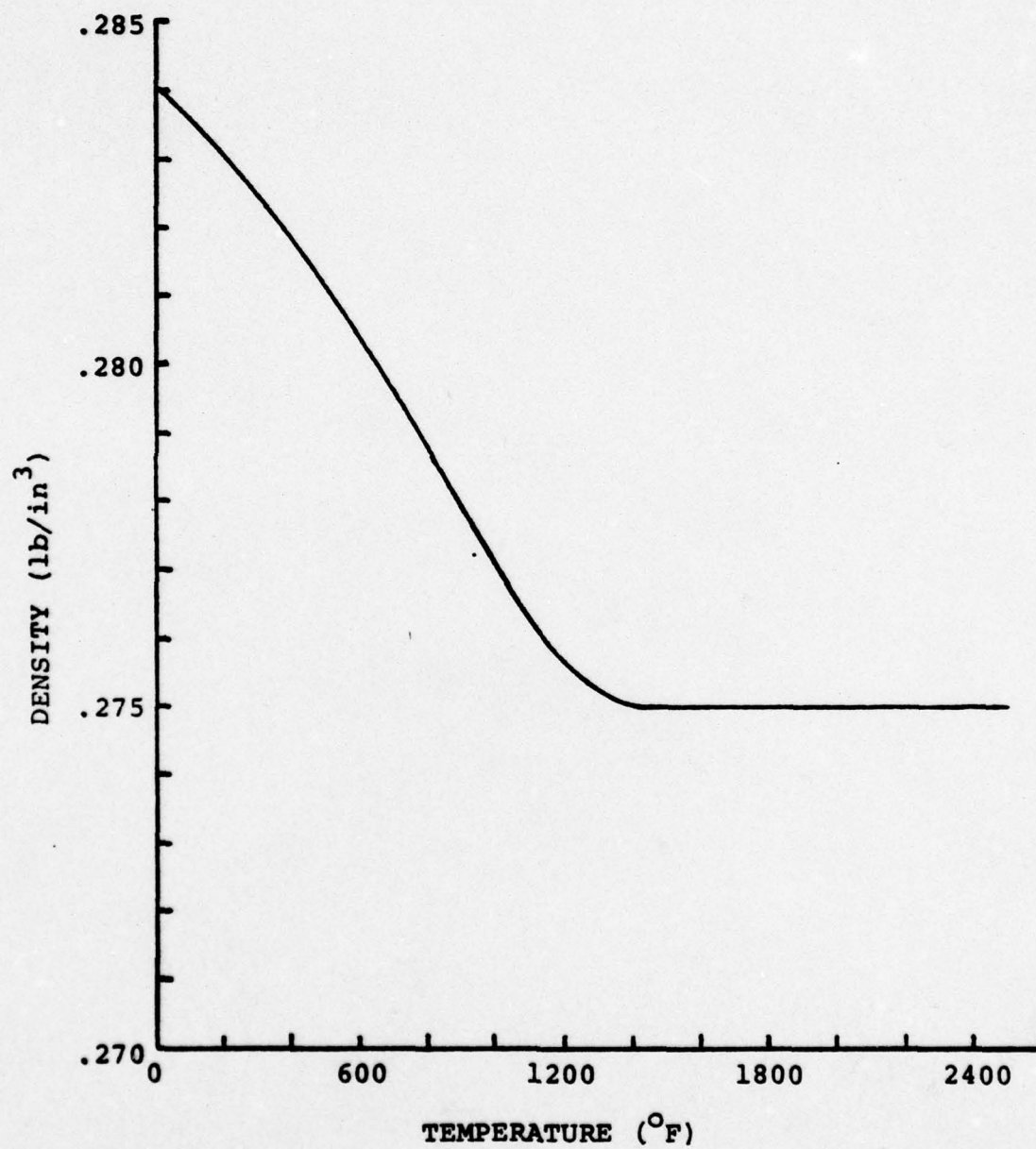


Figure 11 - Estimated Effect of Temperature
on Density of 1020 Steel

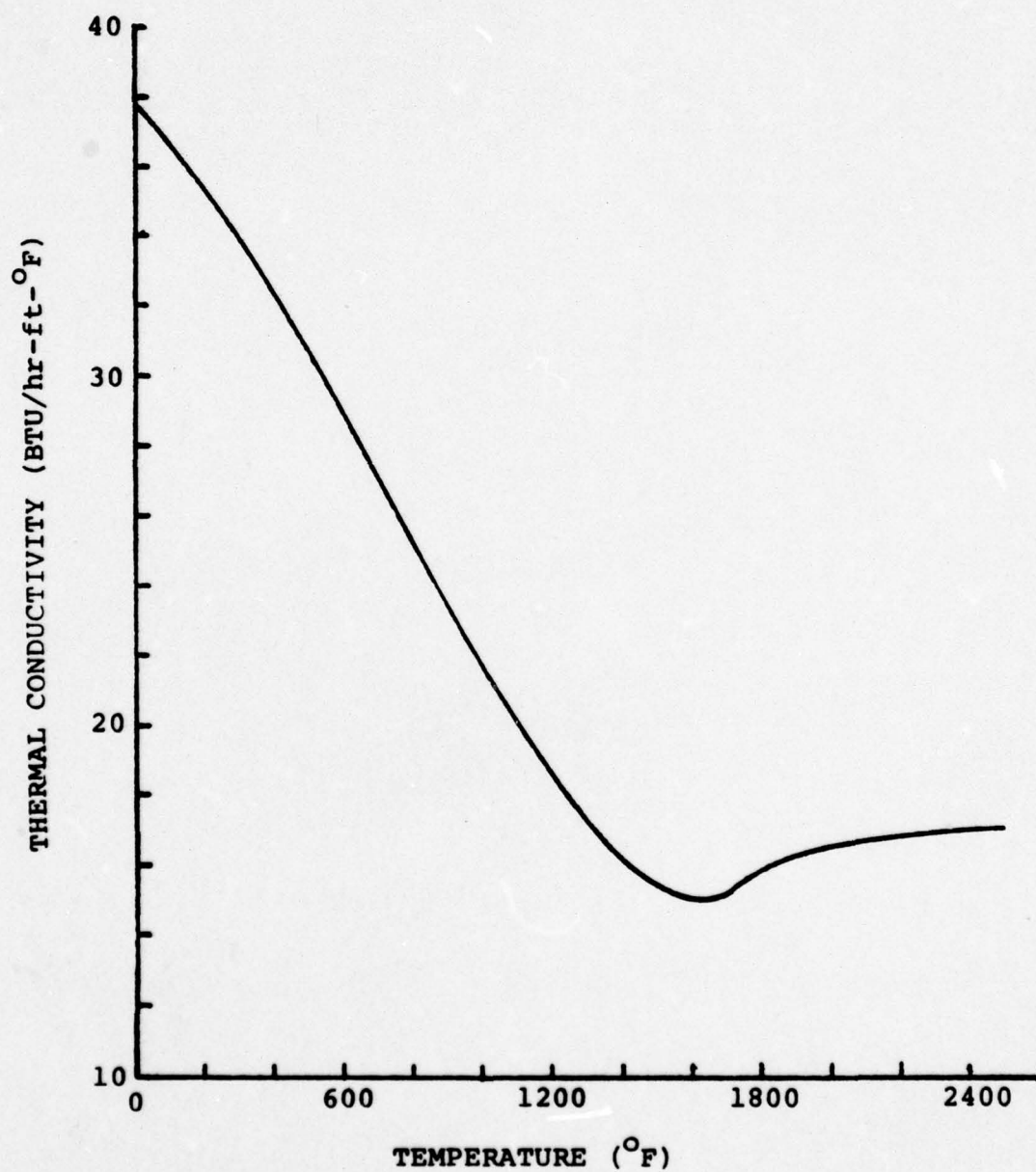


Figure 12 - Estimated Effect of Temperature on the Thermal Conductivity of 1020 Steel

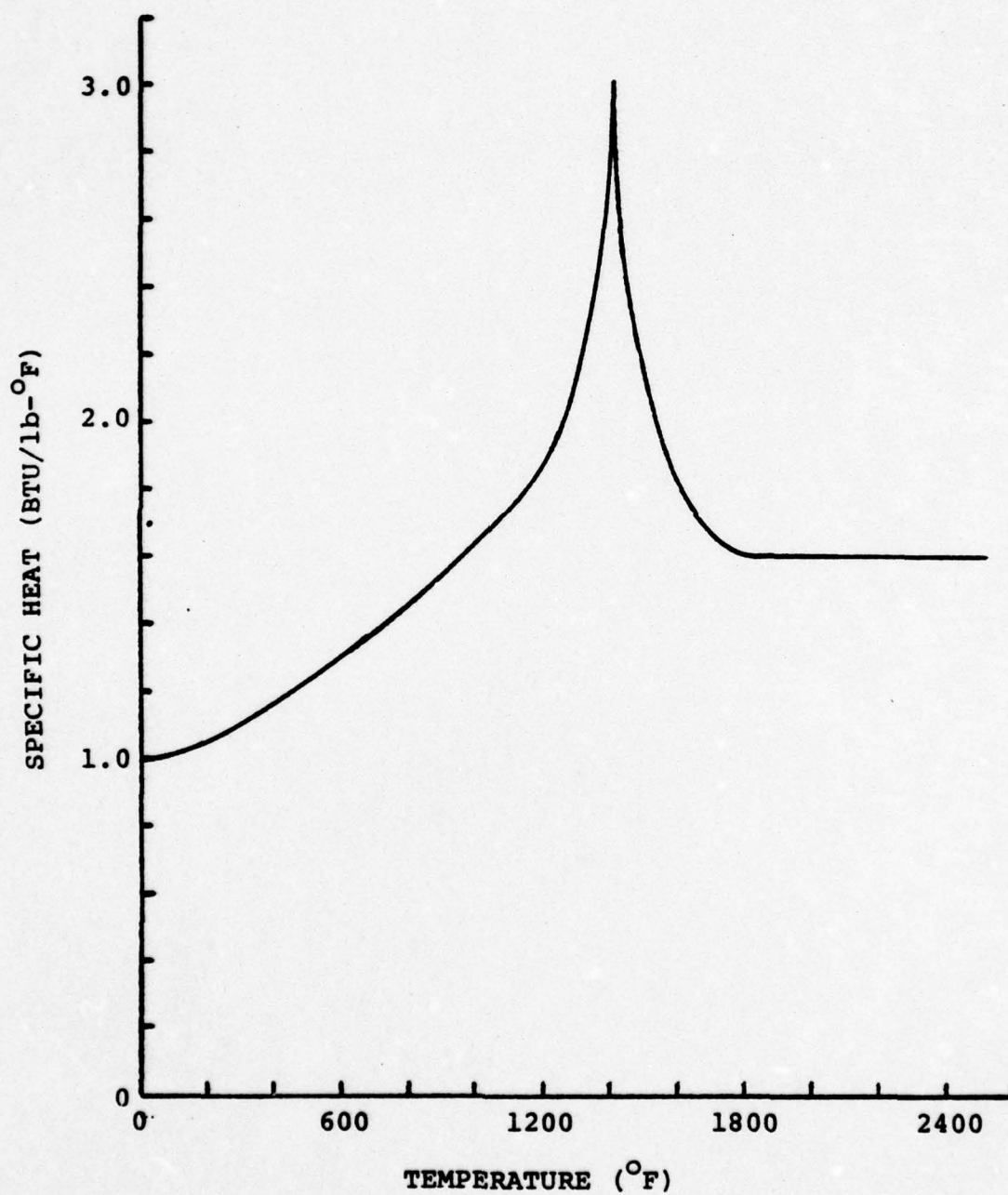


Figure 13 - Estimated Effect of Temperature
on Specific Heat of 1020 Steel

CHAPTER III

PROCEDURES

A. Scope of Research

A series of three experiments was conducted to measure temperature changes and thermal strains which occur in thick plate during multipass welding of unrestrained butt joints. Metal movement, as measured by transverse shrinkage, was measured during one of the experiments.

The two primary experiments were conducted with HY-130 steel, a quenched and tempered steel under development by the U.S. Navy for use in deep diving submersibles. U.S. Navy specifications for the fabrication of this steel by the Gas-Metal-Arc method were followed as closely as possible. The third experiment was conducted with a low carbon steel (by using the Gas-Metal-Arc method of welding). The data obtained experimentally were compared to analytical predictions of temperature and strain produced by the MIT one-dimensional computer program for the analysis of thermal strains during welding.

B. Measurement of Strain

Strain measurements were made on the surface of the metal plate by use of adhesive bonded, electric resistance

strain gages. This method of strain measurement on the test plate is used extensively and is a convenient and accurate method of measurement. When measuring strain with resistance strain gages, the total resistance change measured, ΔR , consists of resistance changes taking place in the test plate due to mechanical strains and thermal strains as well as resistance changes due to thermal strain and thermo-electric changes in the strain gage itself. In the case of welding thermal strains, the total resistance change can therefore be expressed in the following way:

$$\Delta R = \Delta R(e) + \Delta R(p) + \Delta R(T) + \Delta R(g)$$

where

$\Delta R(e)$ = resistance change due to elastic strain
in the test plate.

$\Delta R(p)$ = resistance change due to plastic strain
in the test plate.

$\Delta R(T)$ = resistance change due to temperature
induced thermal strain in the gage.

$\Delta R(g)$ = resistance change due to thermo-
electric effects in the gage.

In studying welding thermal strains, the measurements of interest are $\Delta R(e)$ and $\Delta R(p)$. These can be separated out from ΔR if $[\Delta R(T) + \Delta R(g)]$ can be determined throughout the temperature range. This correction has been made by the gage manufacturer and is supplied with the gages in the form of a curve of apparent strain versus temperature. Therefore,

$$E\Delta R(e) + E\Delta R(p) = E\Delta R - A.S.$$

where A.S. = apparent strain.

C. Apparatus

1. Specimen Preparation

All experiments consisted of the unrestrained butt welding of one inch thick plates. Each plate measured approximately 12" x 24" and after welding created a plate with dimensions 24" x 24". In accordance with U.S. Navy specifications, the weld joint configuration chosen was a double-V groove with a 60° included angle. The plates were first flame cut to their 12" x 24" dimensions and then the edges to be welded were machined to the proper configuration. The surfaces of the plates near the weld line were mechanically cleaned in order to remove as much

potential weld contamination as possible. The specimen arrangement and weld joint configuration are shown in Figures 15 and 16 respectively.

2. Instrumentation

Strain on the surface of the specimen plates was measured by electric resistance strain gages set at varying transverse distances from the weld line, but at the same longitudinal position. The strain gages consisted of a 90° pair which allowed the simultaneous measurement of longitudinal and transverse strains during welding. The strain gage specifications are contained in Table V and the curve of apparent strain versus temperature for these gages is shown in Figure 14.

Temperature was measured on the surfaces of the specimen plates by use of Chromel/Alumel adhesive bonded thermocouples referenced to 32°F. These thermocouples were positioned at transverse positions from the weld line corresponding to the transverse positions of the strain gages. On the Specimen I HY-130 plate and on the low carbon steel specimen plate, the thermocouples were positioned 0.5 inches ahead of the strain gages. On the Specimen II HY-130 plate, the thermocouples were positioned 1.0 inches ahead of the strain gages. When reducing the

data, the time the welding arc passed the thermocouples was referenced to the time the arc passed the position of the strain gages so that correct corresponding values of temperature and strain were obtained.

Temperature and strain were simultaneously read out on a twelve channel, continuous recording Visicorder. Thermocouple and strain gage locations are indicated in Figures 18 - 21.

D. Experiment Procedure

Welding on all tests was performed by the semi-automatic gas-metal-arc method (GMA), using a SVI-300 power supply and associated controls manufactured by the Linde Division of Union Carbide Corporation. Arc travel speed, voltage, and amperage were set prior to the start of welding on each test specimen in order to obtain the desired heat input. Pre-heat was applied by oxygen-acetylene torches and monitored by the installed thermocouples. Interpass temperature was also monitored by the installed thermocouples.

The test plates were lined up with the welding head and tack welded together at one end. The welding head was then moved to the starting end of the weld line and preheat was applied to the plates. When the temperature of

TABLE V
STRAIN GAGE PROPERTIES

Gage	SR-4 90°
Designation	FAET-18D-12-S6
Manufacturer	BLH Electronics
Grid Dimensions	.19 x .19 inches
Temperature Range	-100 - 500°F
Resistance	120 Ohms
Gage Factor	1.98
Cement	EPY-500

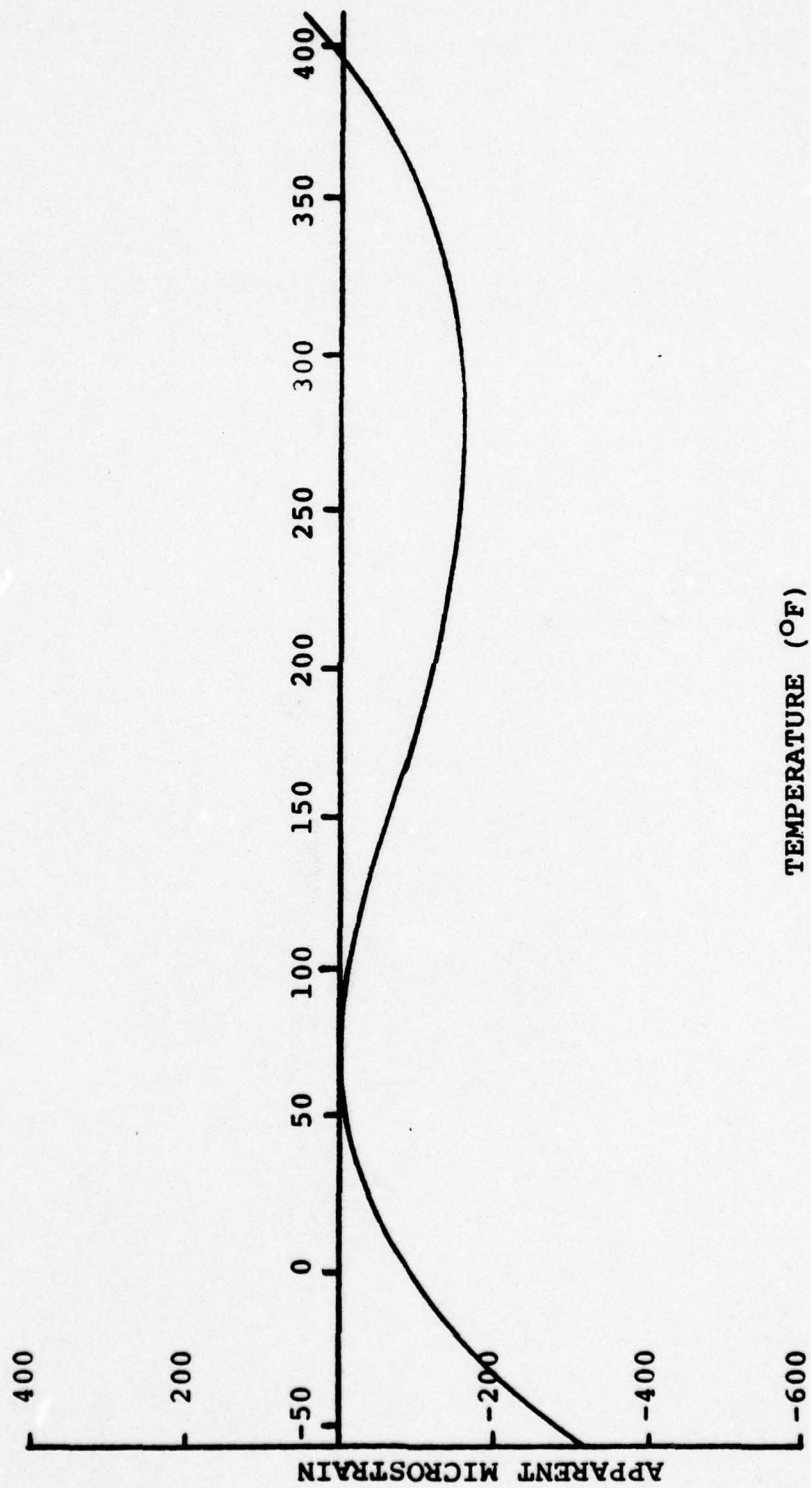


Figure 14 - Effect of Temperature on Apparent Strain for SR-4 Strain Gage

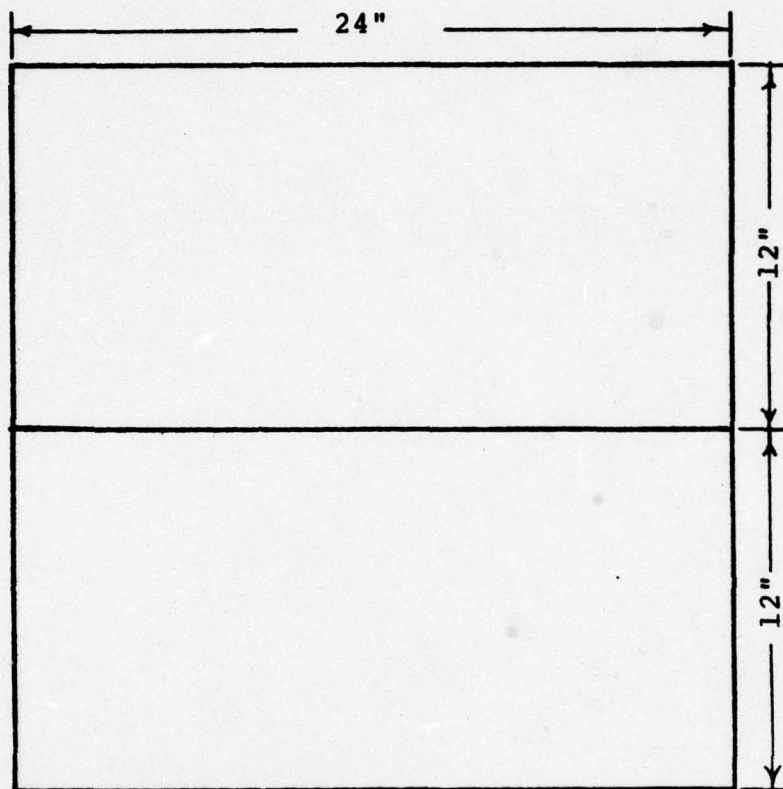


Figure 15 - Test Plate Arrangement

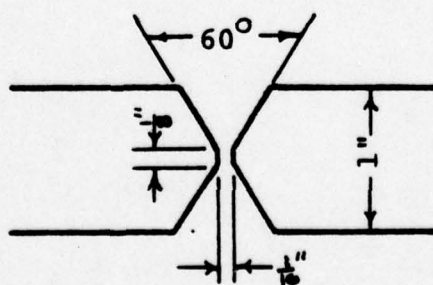


Figure 16 - Weld Joint Configuration

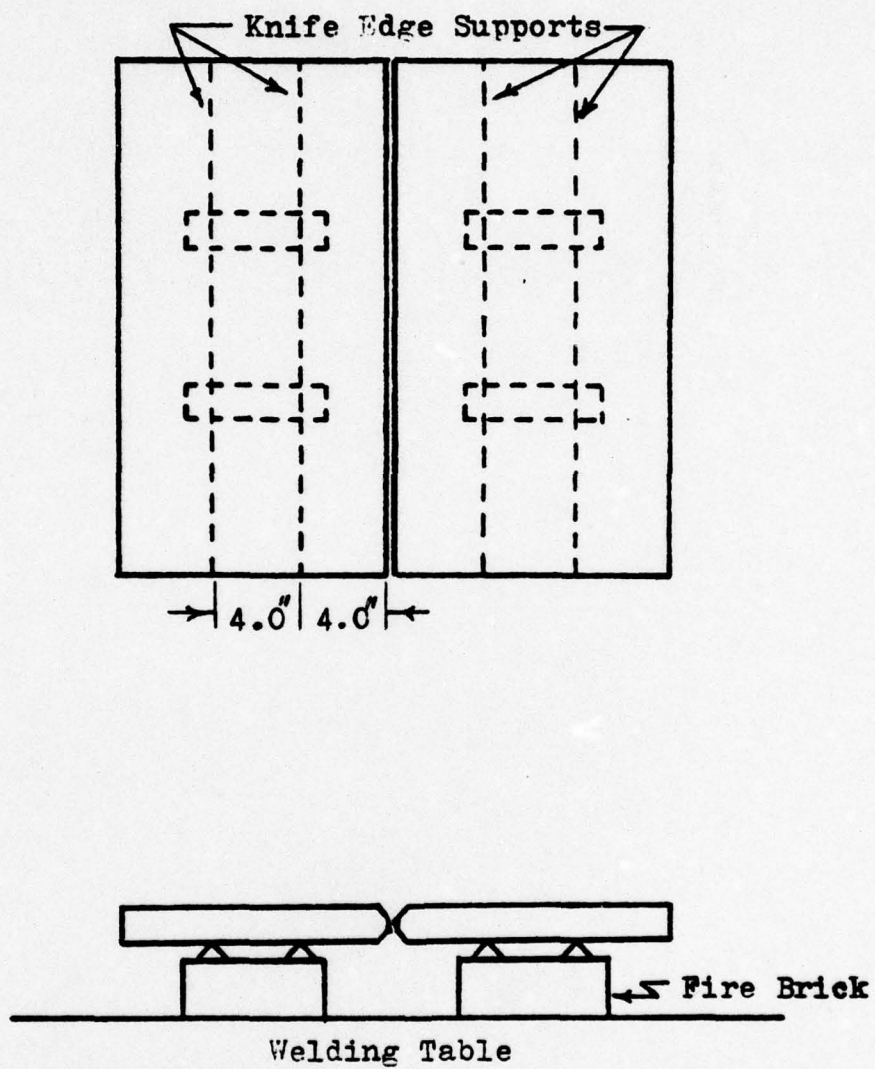


Figure 17 - Test Plate Support Arrangement

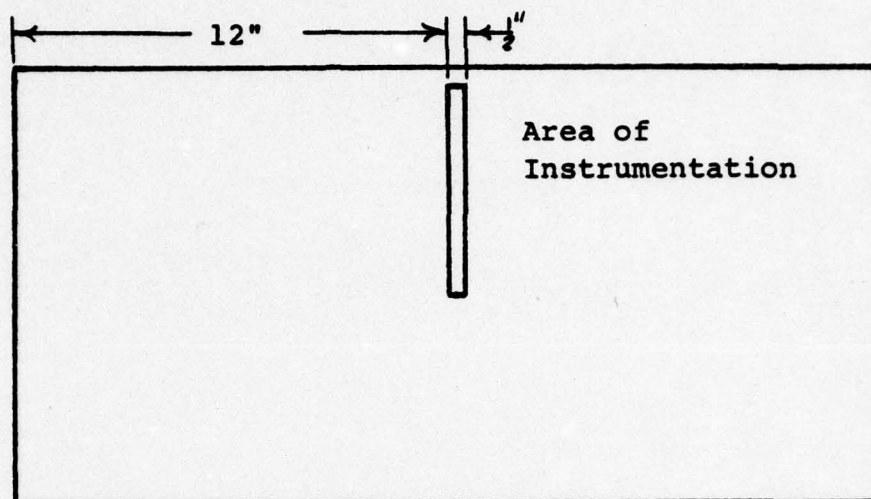


Figure 18 - Location of Instrumentation on HY-130
Specimen I and 1020 Steel

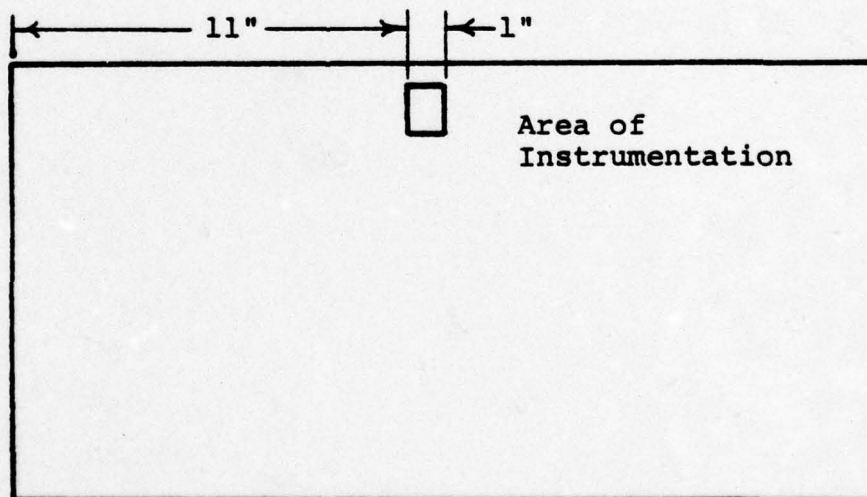


Figure 19 - Location of Instrumentation on HY-130
Specimen II

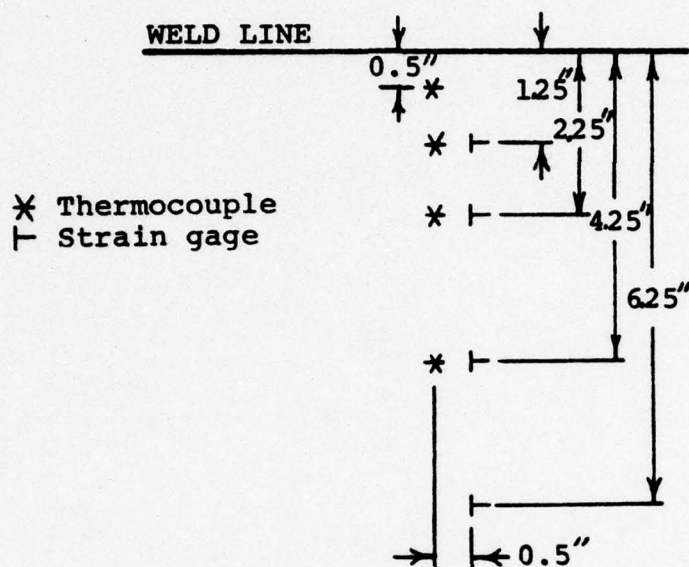


Figure 20 - Thermocouple and Strain Gage Location on HY-130 Specimen I and 1020 Steel

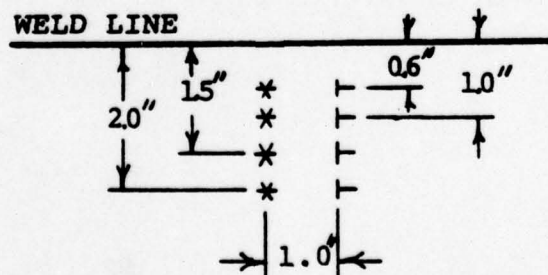


Figure 21 - Thermocouple and Strain Gage Location on HY-130 Specimen II

the test specimen, as measured by the thermocouples, averaged between 150°F and 175°F, the visicorder was actuated and an arc was struck to begin the first pass. When the arc reached the end of the weld line, it was extinguished and the welding head was returned to the starting point. The visicorder continued to record temperatures and strains continuously for approximately one minute and then intermittently until the next pass was to be made. The test specimen air cooled until the desired interpass temperature range of 150°F-175°F was reached as measured by the thermocouple nearest the weld line. At this point the visicorder was actuated, the arc struck, and the process repeated for the next pass. This procedure was repeated for each of the six passes needed to fill the upper half of the double-V groove. After the completion of the sixth pass, the test specimen was allowed to cool to room temperature. Welding conditions are summarized in Table VI.

TABLE VI

TEST PLATE	1020	HY-130 SPECIMEN I	HY-130 SPECIMEN II
WELD TYPE	BUTT	BUTT	BUTT
PROCESS	GMA	GMA	GMA
ARC VOLTS	26	25	25
POLARITY	DCRP	DCRP	DCRP
TRAVEL SPEED (ipm)	12	12	12
HEAT INPUT (Kjoules/in)	39	37	37
FILLER WIRE	.0625" A-675	0.045" Linde-140	0.045" Linde-140
SHIELDING GAS	AR, 25% CO ₂	AR, 2% O ₂	AR, 2% O ₂
NUMBER OF PASSES	6	6	6
PREHEAT & INTER PASS TEMP.	150-175°F	150-175°F	150-175°F

WELDING CONDITIONS

CHAPTER IV

RESULTS

A. Presentation of Data

The experimental results are presented as measurements of longitudinal strain versus time for the strain results and temperature versus time for the temperature measurements. The time axis refers to the time elapsed from the start of one pass until the start of the next pass. The time scales for each pass have been adjusted and the data is presented so that the arc passes the point of observation at the time of 40 seconds. This point is marked on each graph. This manipulation of time scales is permissible because there is minimal movement in either temperature or strain during the first 20 seconds of each pass. Note the change in scale at 100 seconds to that of a log plot from 100 to 1000 seconds. Temperature is measured in degrees Fahrenheit. Longitudinal strain is presented as units of microstrain, which equals 10^{-6} in/in.

Figures 22 through 31 present the experimental mechanical strain results for HY-130. First, the results for Specimen I are presented with the longitudinal strain measured at 1.25", 2.25", and 4.25" from the weld line presented in a graph for each of the passes 2-6. The strain and temperature movement measured at 6.25" were

minimal and therefore are not presented. The results for Specimen II are then presented, with the longitudinal strain measured at 1.0", 1.5", and 2.0" from the weld line shown on graphs for passes 2-6. The longitudinal strain measurements at 0.6" from the weld line on Specimen II are shown in Figure 32. These were separated from the other HY-130 results because of the uniqueness of the curves. The results shown are for passes 2, 3, and 5. Pass 4 is very similar to pass 3 and the results for pass 6 are unreliable because the temperature of the strain gage greatly exceeded the maximum allowable temperature of the gage for a significant amount of time.

Figures 33 through 37 present the experimental mechanical strain results for 1020 steel. The longitudinal strain measured at 1.25", 2.25", and 4.25" from the weld line are presented together for each pass, 2-6. The strain measured at 6.25" from the weld line was insignificant and therefore not presented.

Figures 38 through 46 show comparisons between experimental results and predictions by the one-dimensional computer program for both temperature and longitudinal strain. The results shown are for pass 3 and are entirely representative of the comparisons for the other passes. The results for HY-130, both measured and predicted at

1.0", 1.25", 2.0", 2.25", and 4.25" from the weld line, are presented as well as the results for 1020 steel at 1.25", 2.25", and 4.25" from the weld line.

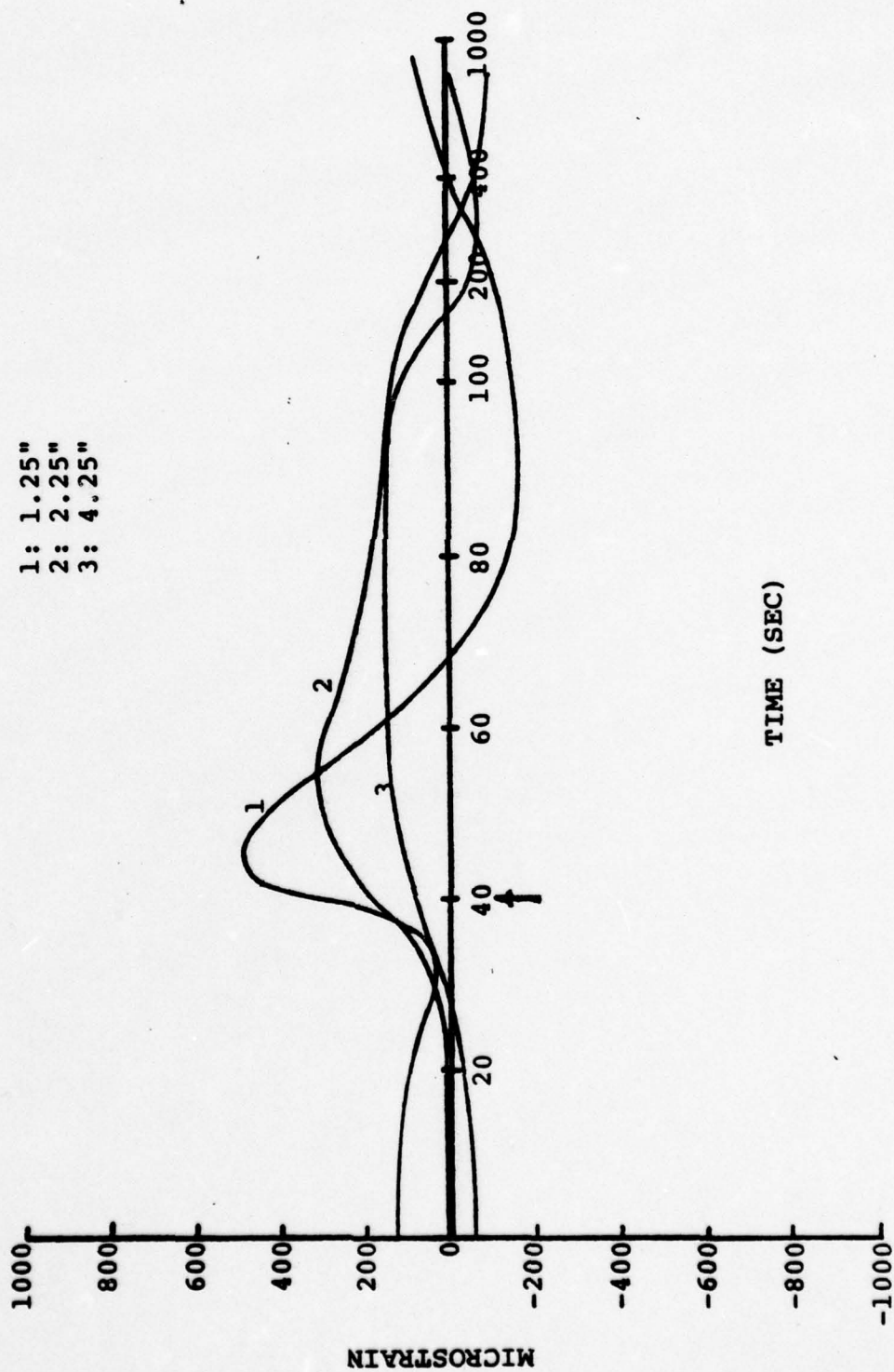


Figure 22 - HY-130 Specimen I, Experimental Results, Pass 2

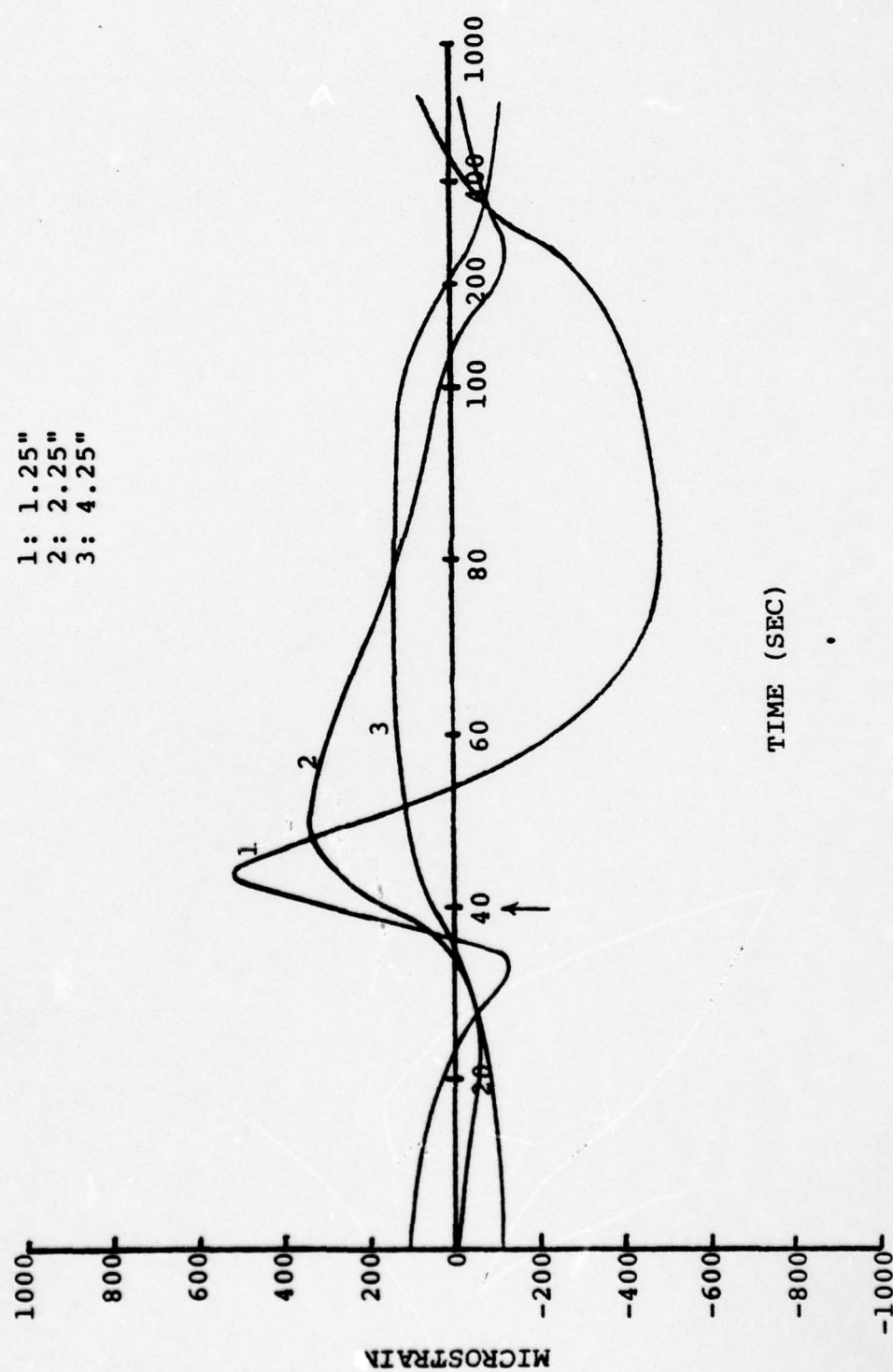


Figure 23 - HY-130 Specimen I, Experimental Results, Pass 3

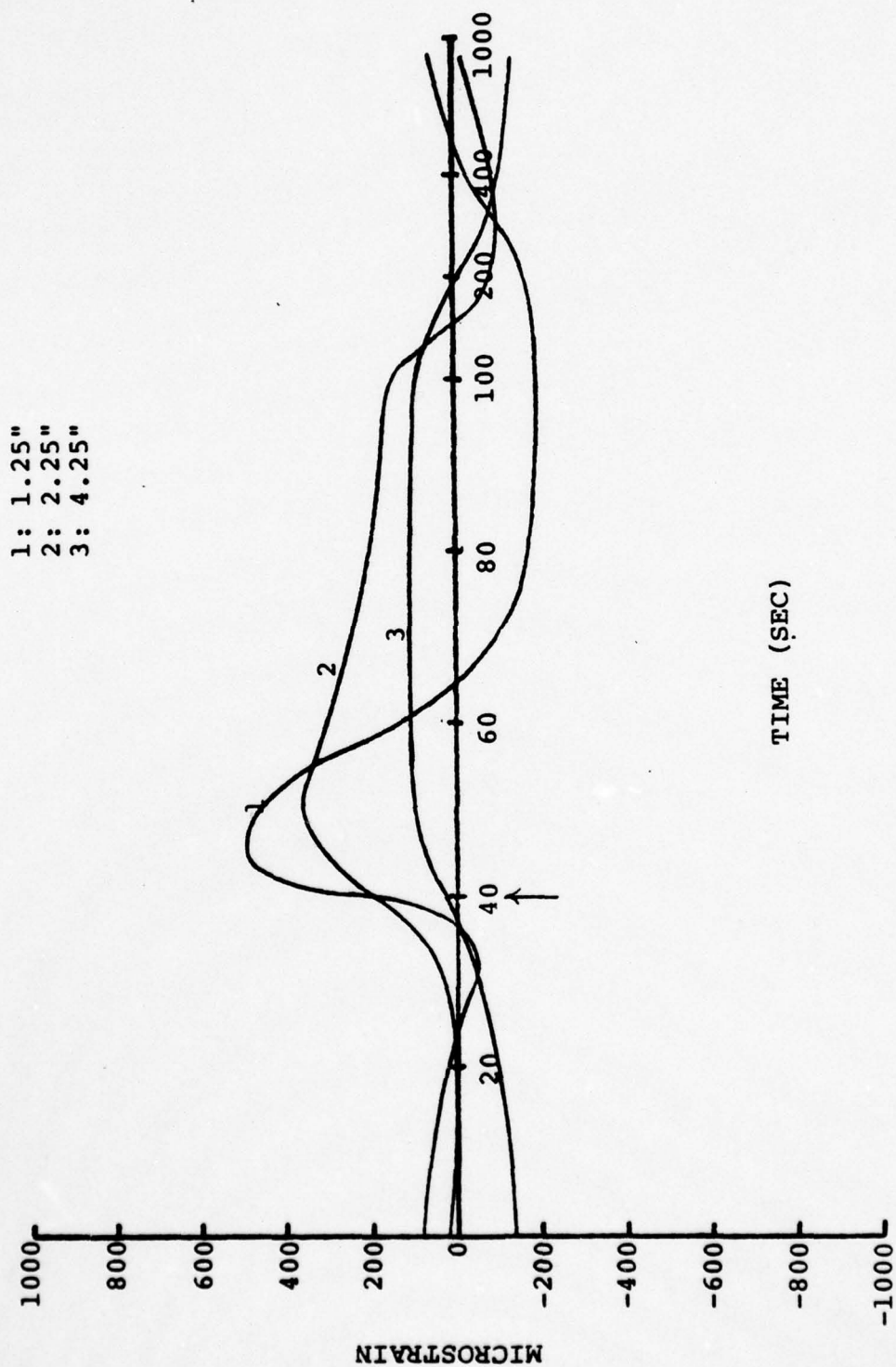


Figure 24 - HY-130 Specimen I, Experimental Results, Pass 4

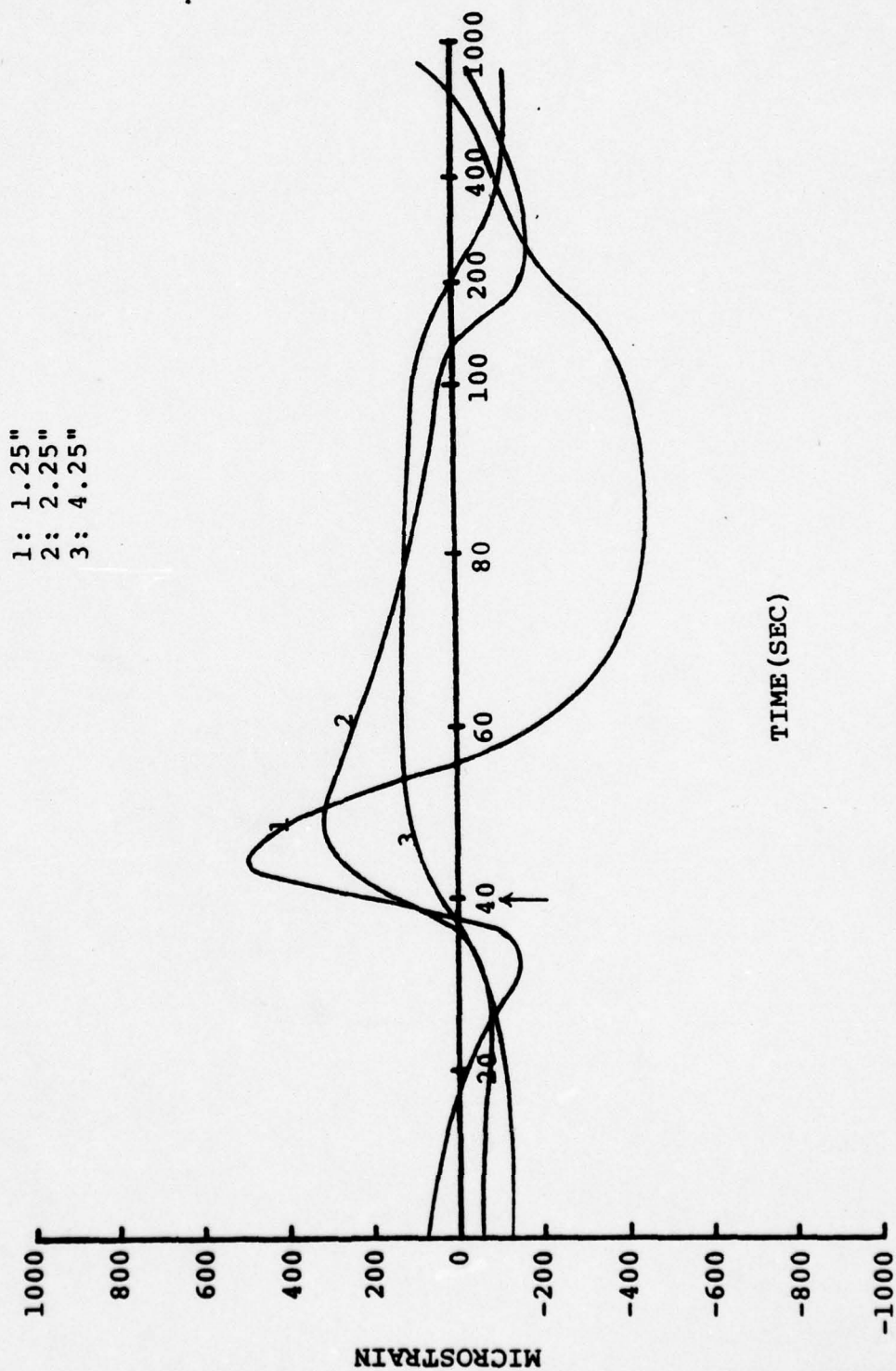


Figure 25 - HY-130 Specimen I, Experimental Results, Pass 5

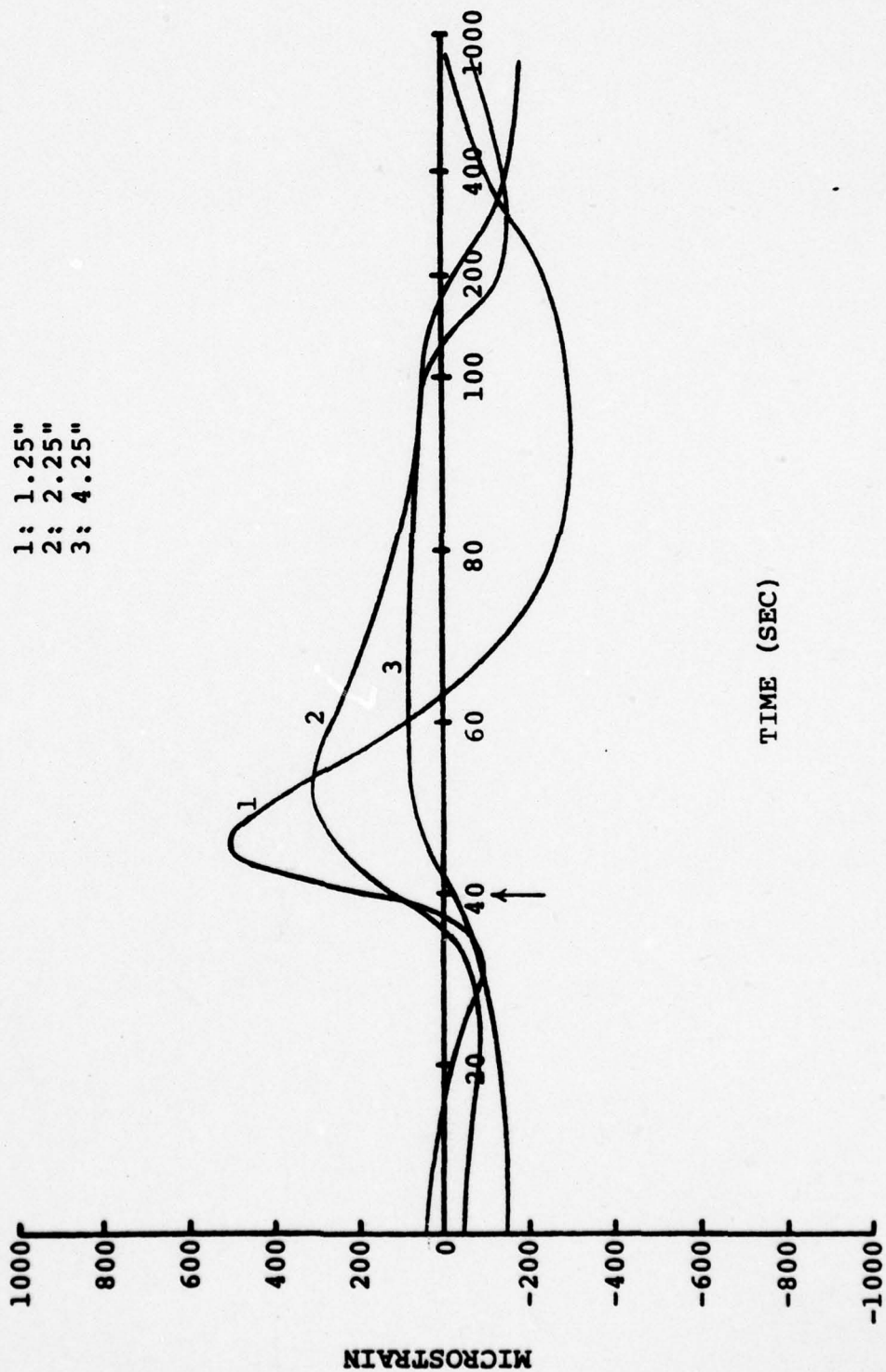


Figure 26 - HY-130 Specimen I, Experimental Results, Pass 6

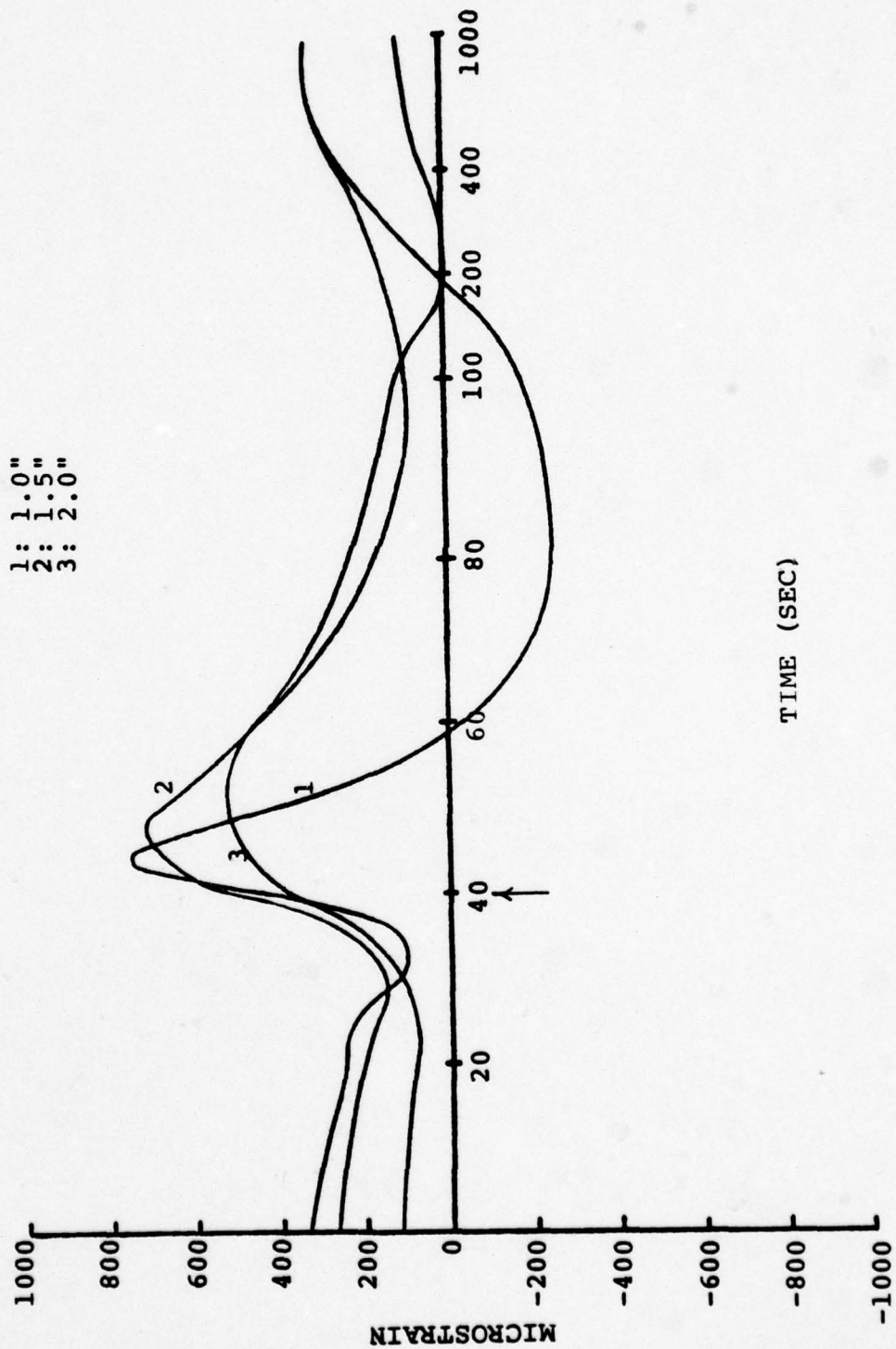


Figure 27 - HY-130 Specimen II, Experimental Results, Pass 2

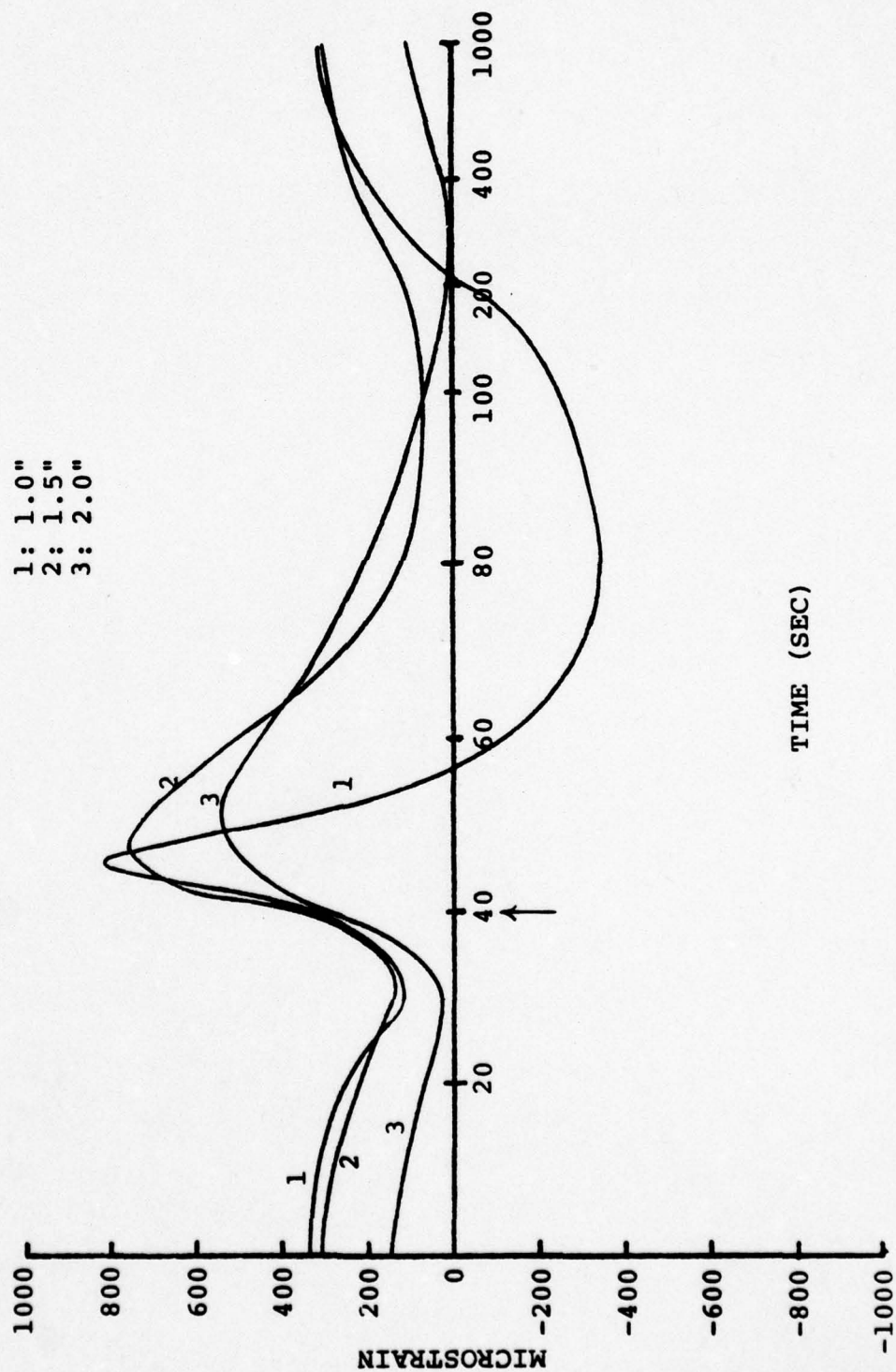


Figure 28 - HY-130 Specimen II, Experimental Results, Pass 3

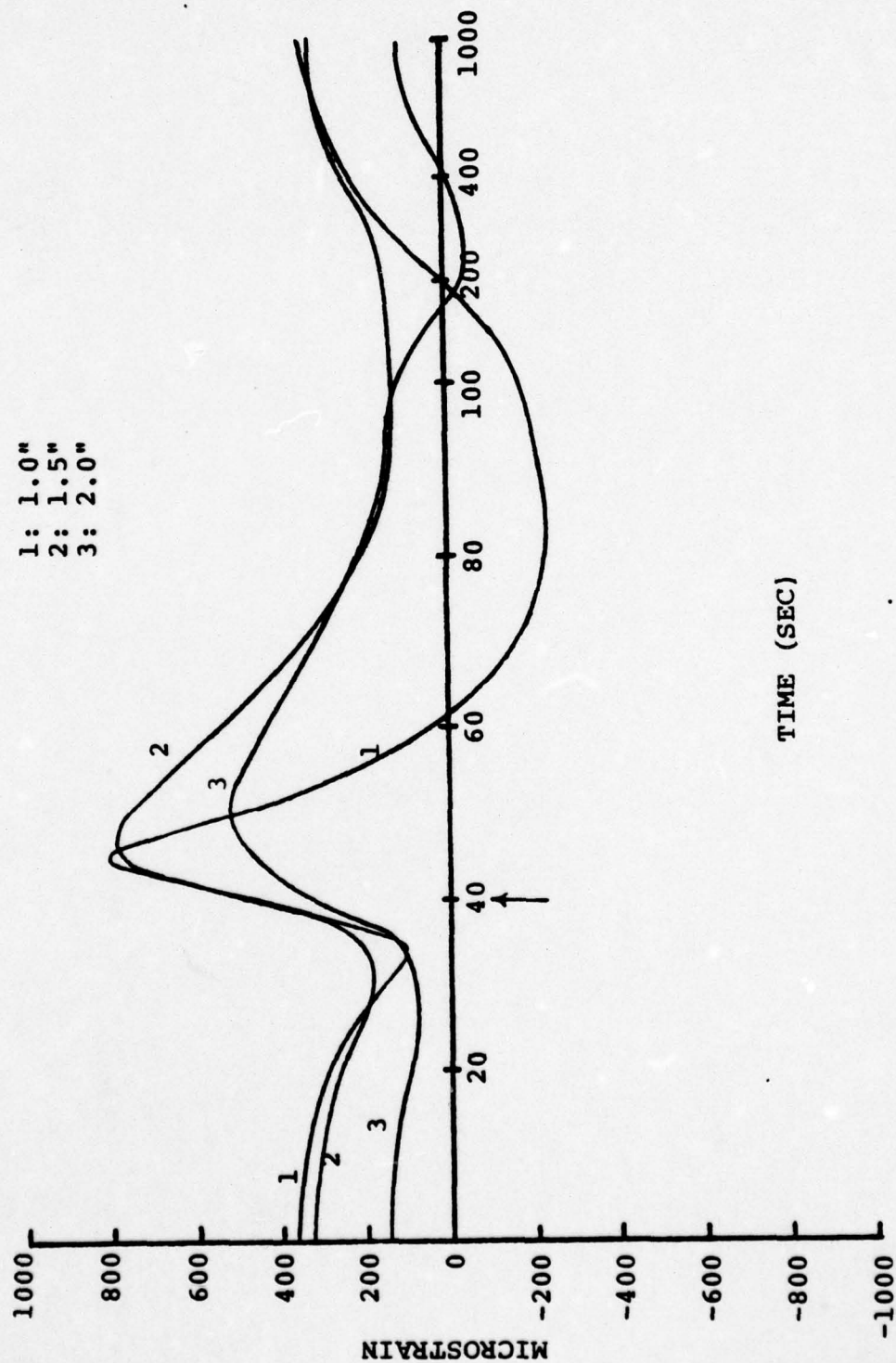


Figure 29 - HY-130 Specimen II, Experimental Results, Pass 4

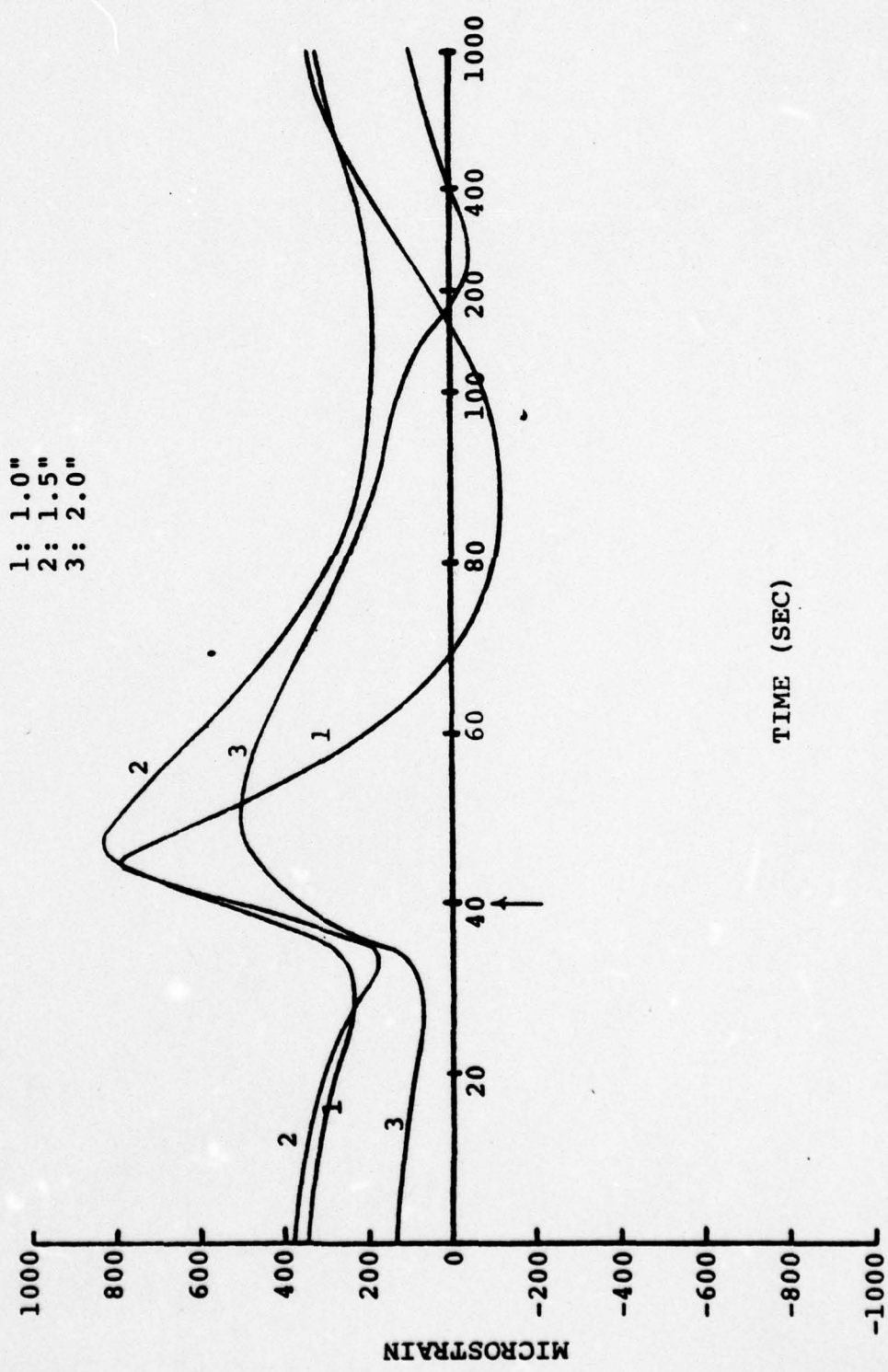


Figure 30 - HY-130 Specimen II, Experimental Results, Pass 5

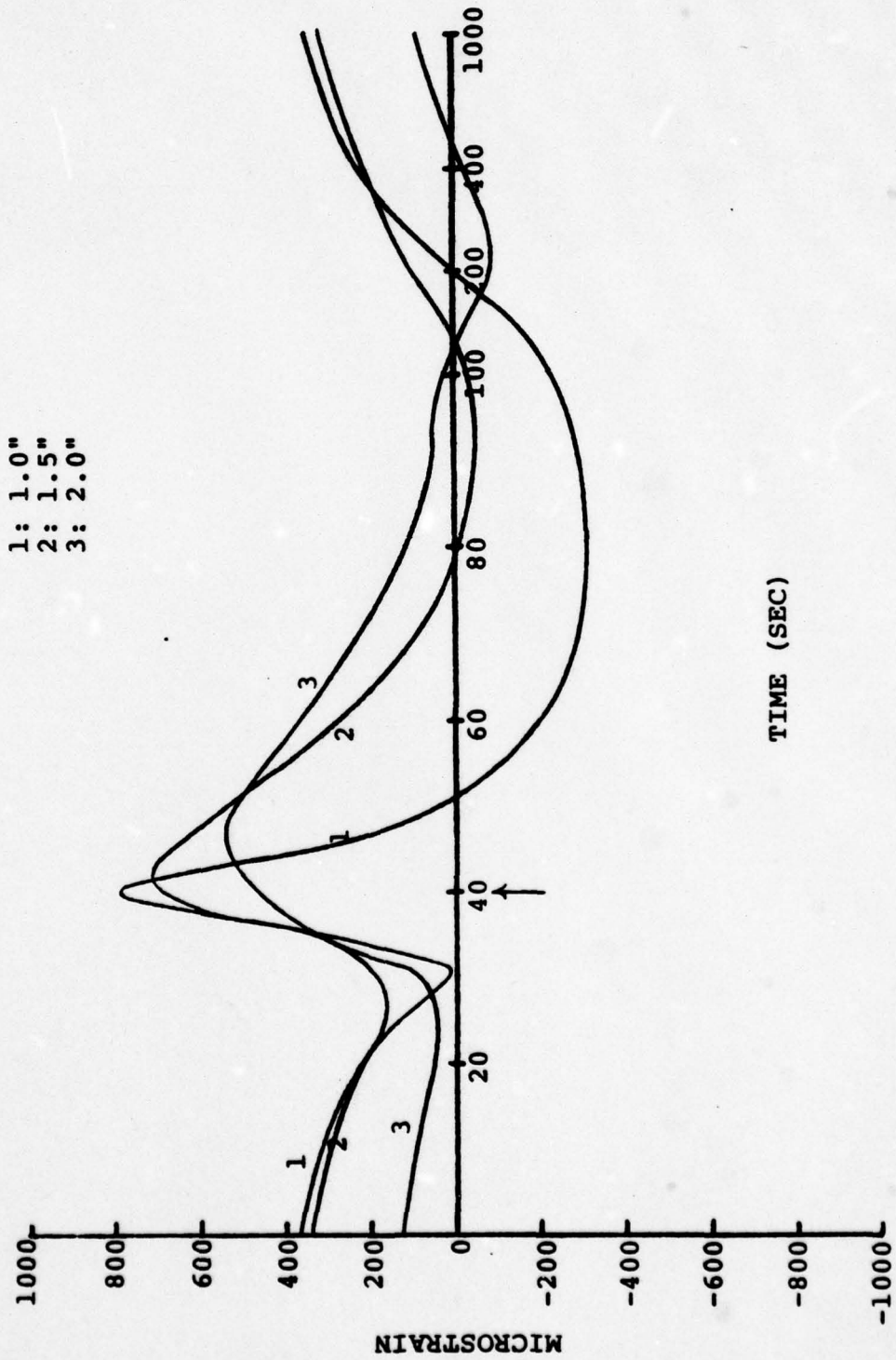


Figure 31 - HY-130 Specimen II, Experimental Results, Pass 6

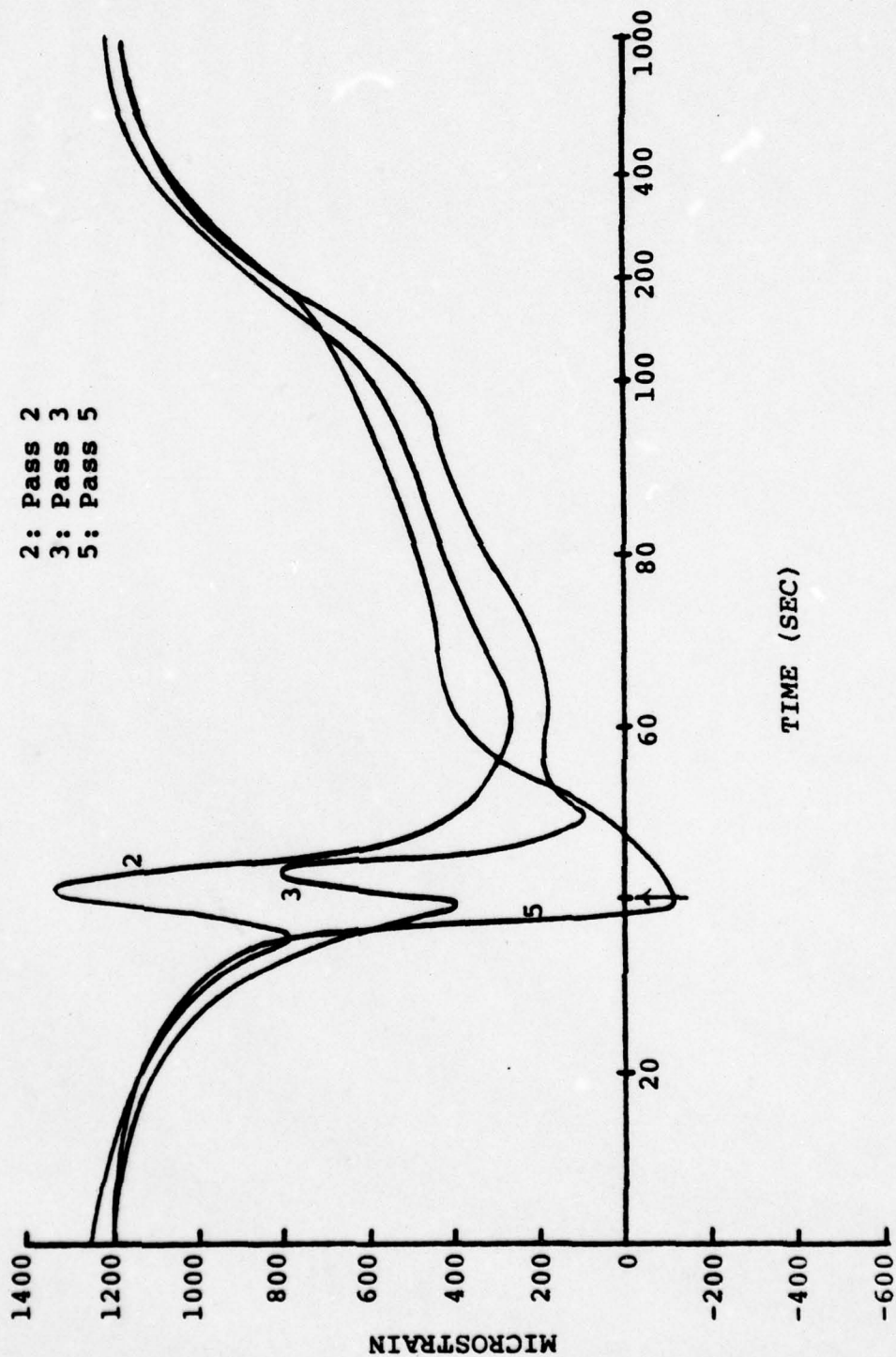


Figure 32 - HY-130 Specimen II, Experimental Results at 0.6" from Weld Line

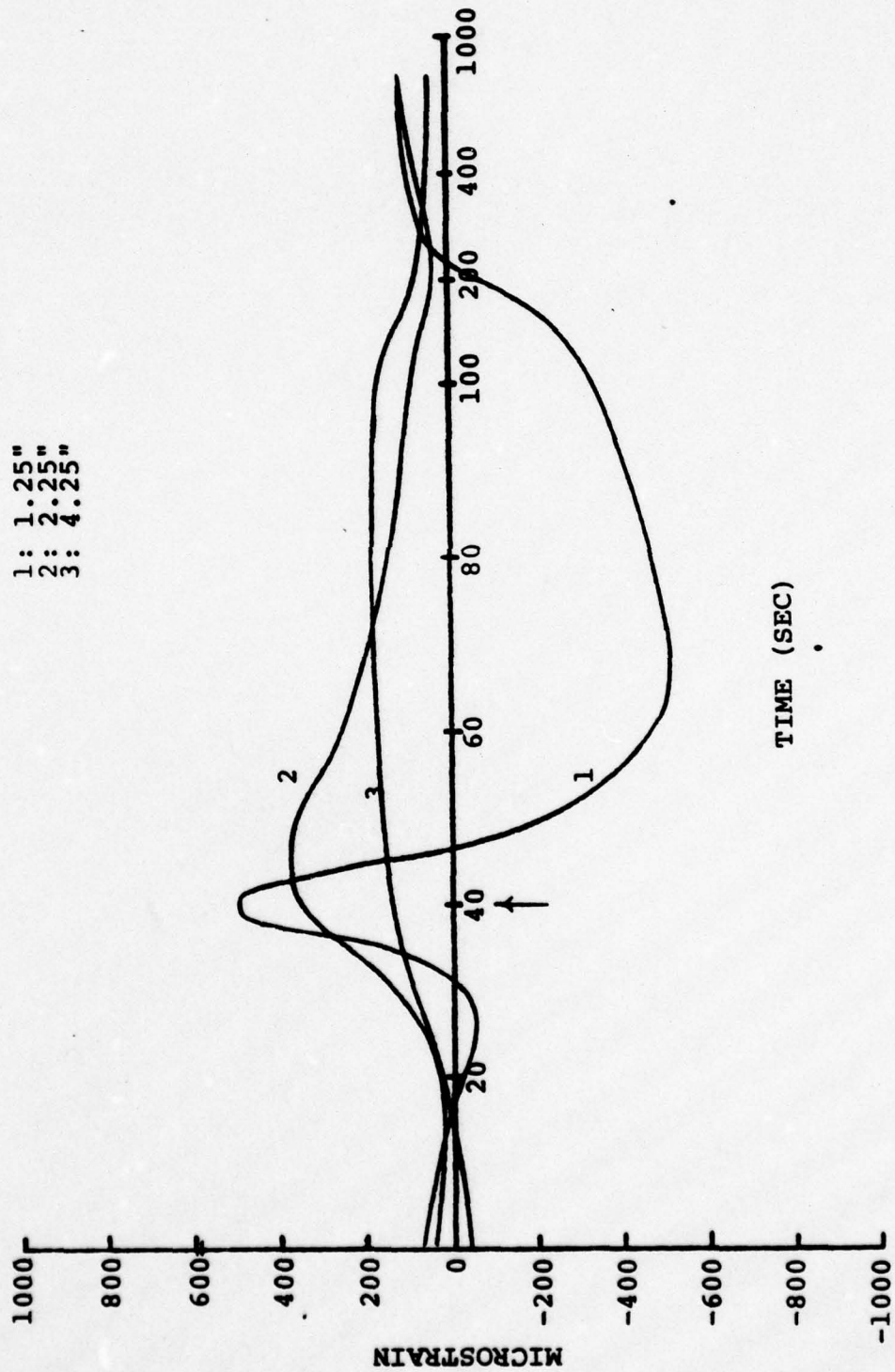


Figure 34 - 1020 Steel, Experimental Results, Pass 3

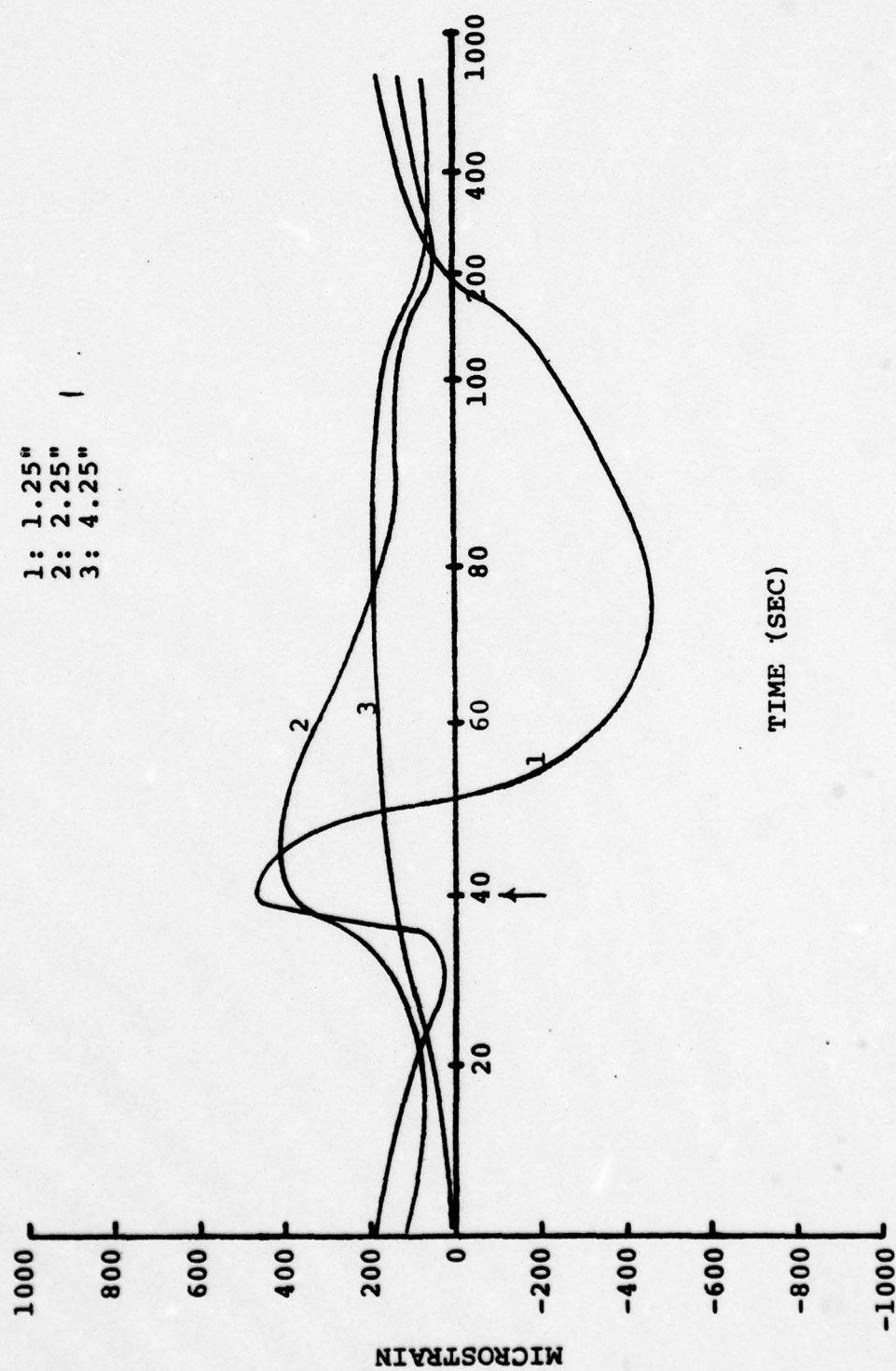


Figure 35 - 1020 Steel, Experimental Results, Pass 4

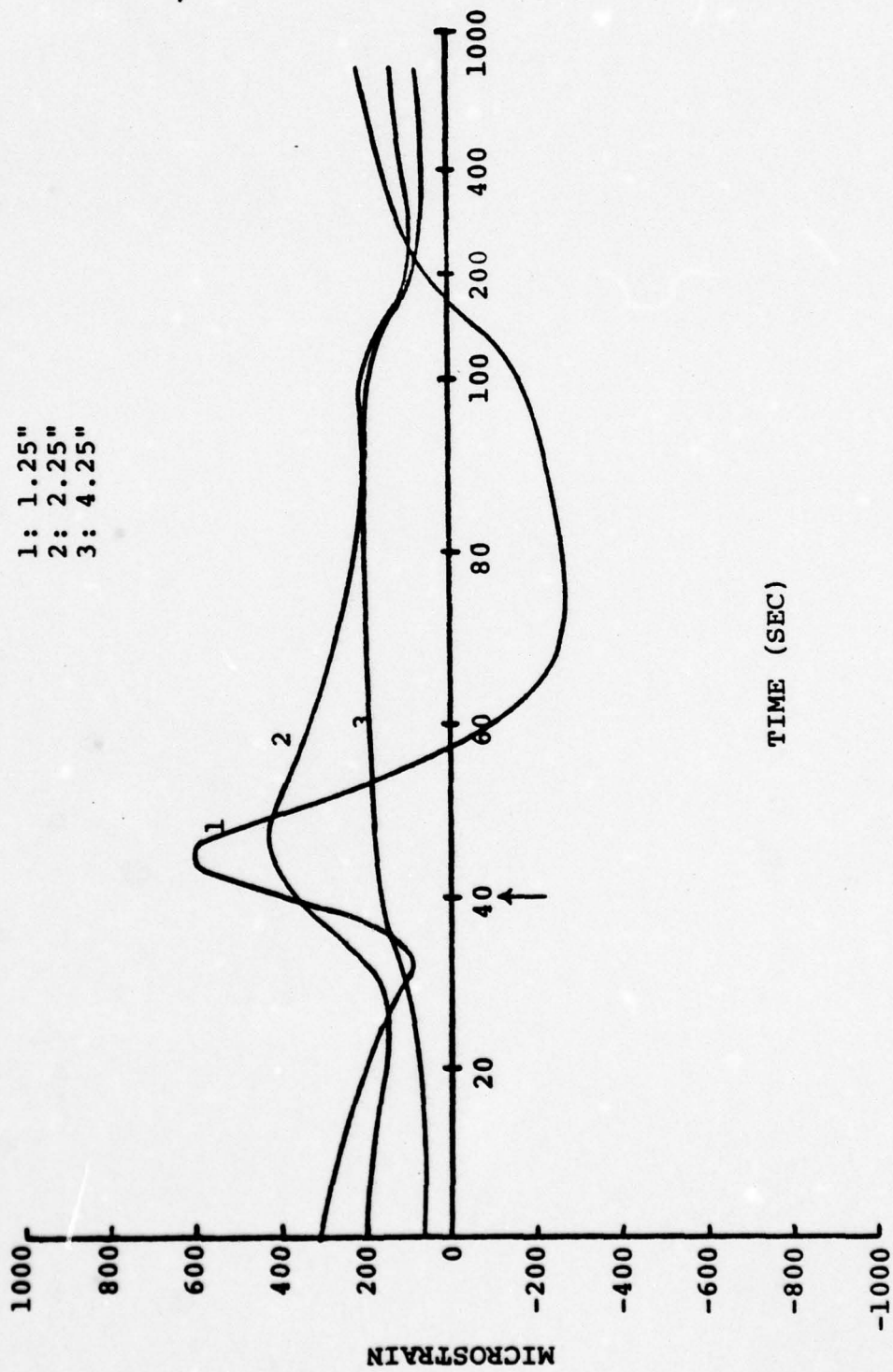


Figure 36 - 1020 Steel, Experimental Results, Pass 5

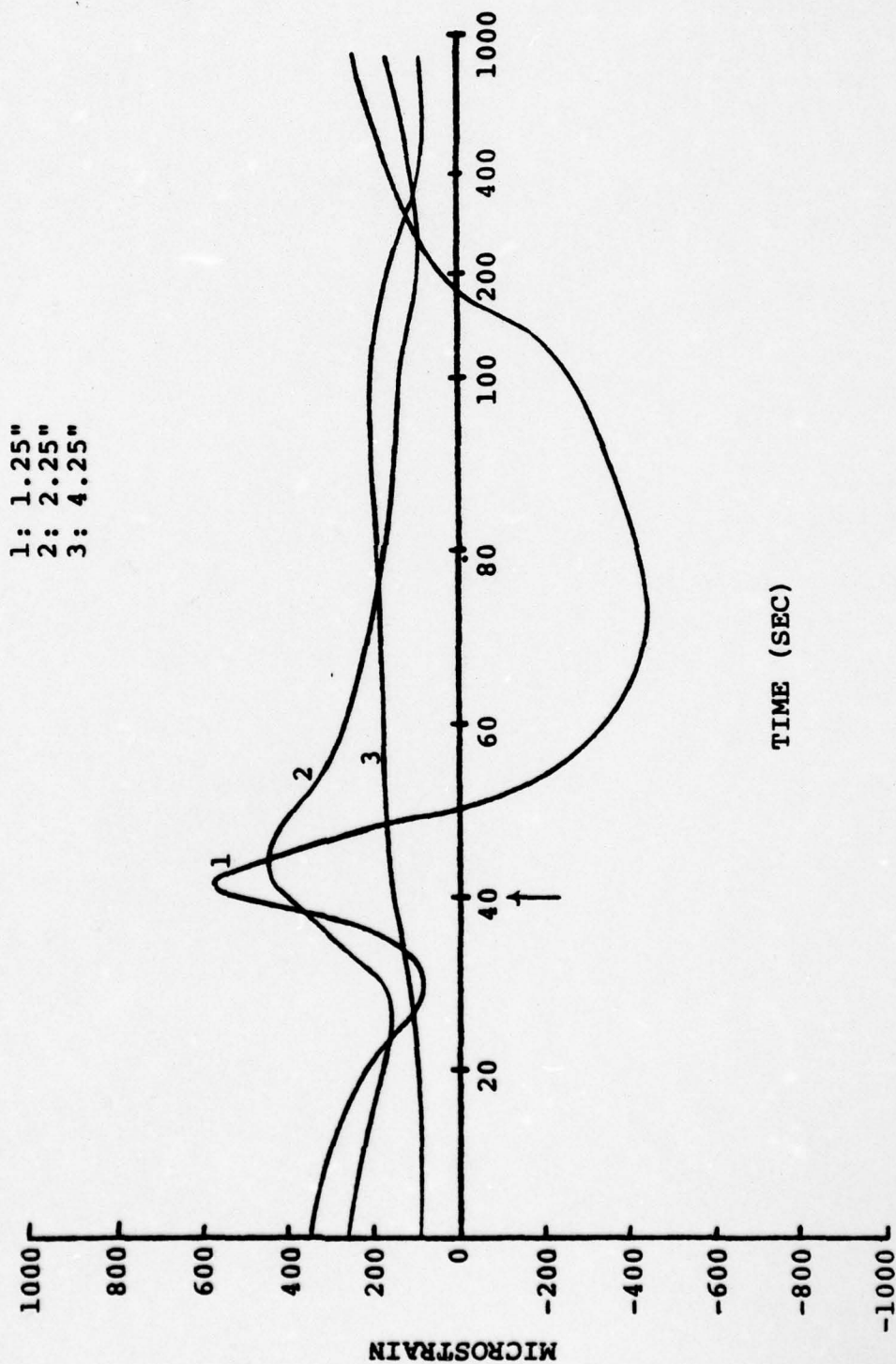
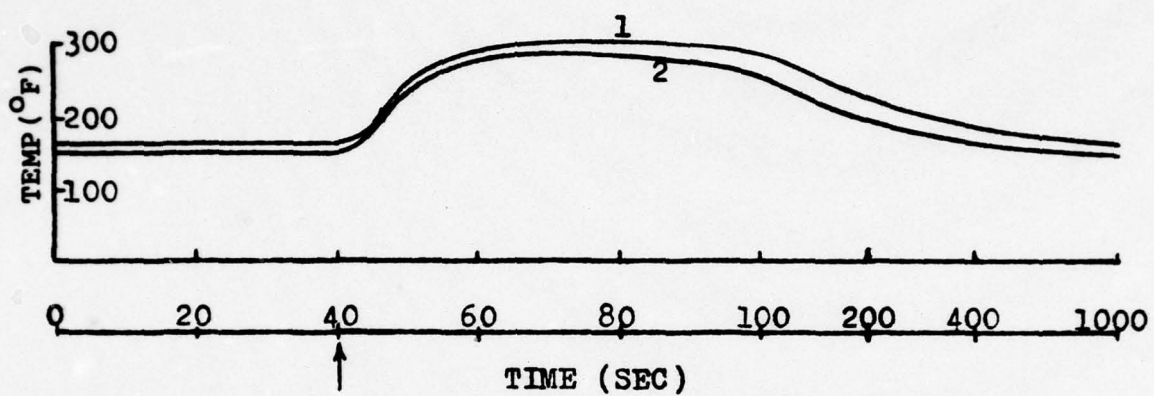


Figure 37 - 1020 Steel, Experimental Results, Pass 6



1: Experiment
2: Computer

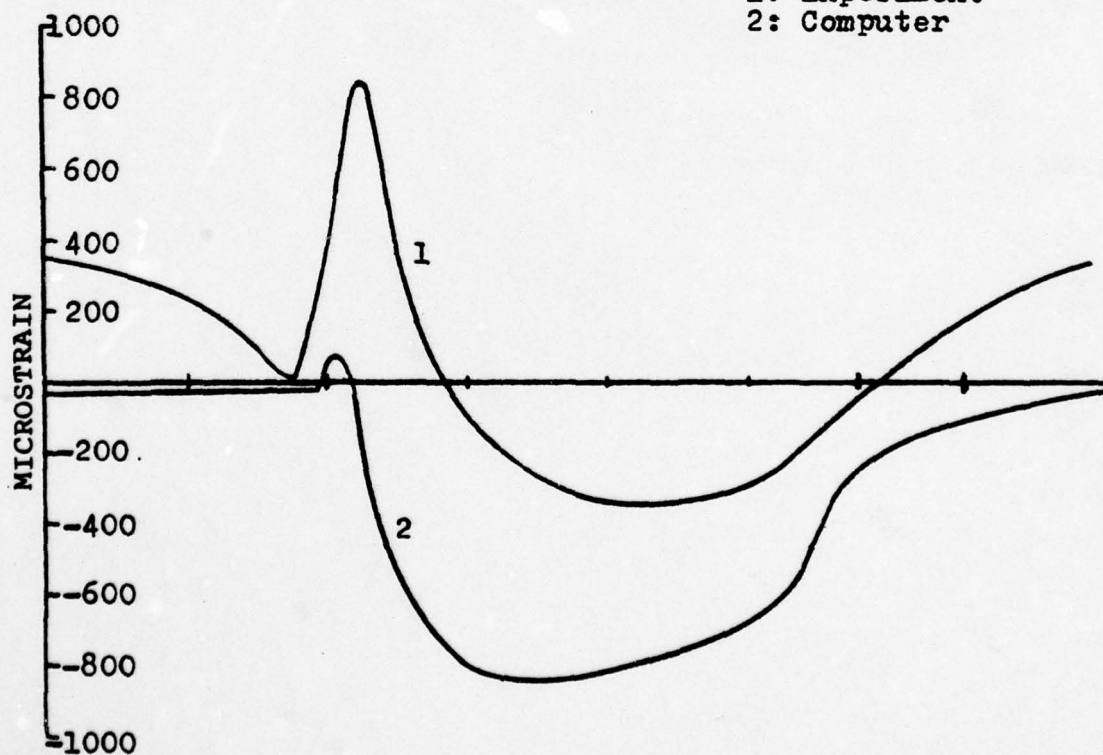


Figure 38 - HY-130 Specimen II, 1.0", Temperature and Strain Analytical Comparison, Pass 3

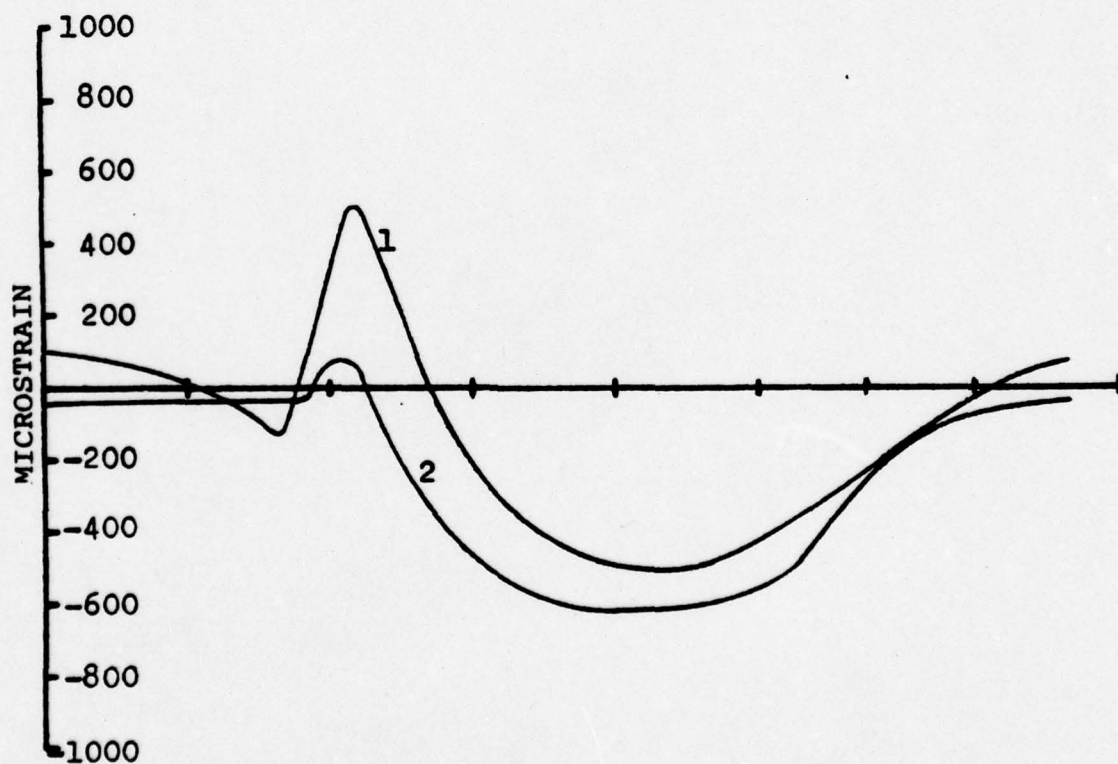
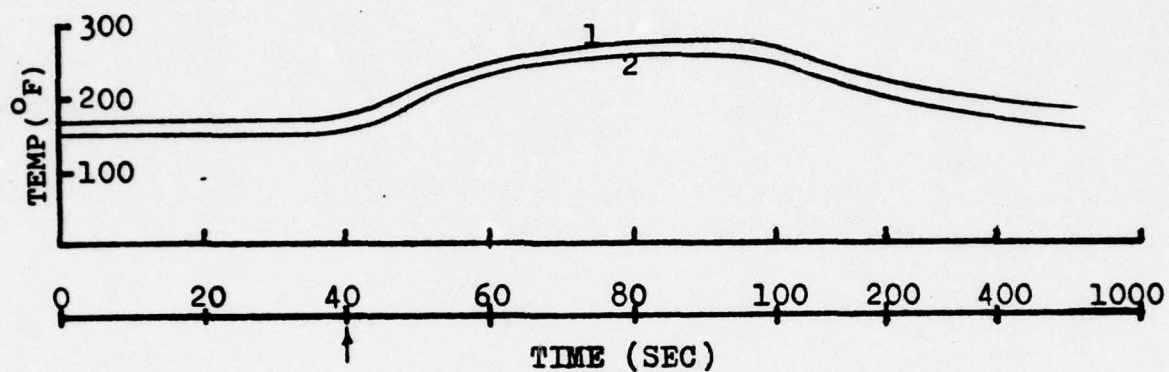


Figure 39 - HY-130 Specimen I, 1.25", Temperature and Strain Analytical Comparison, Pass 3

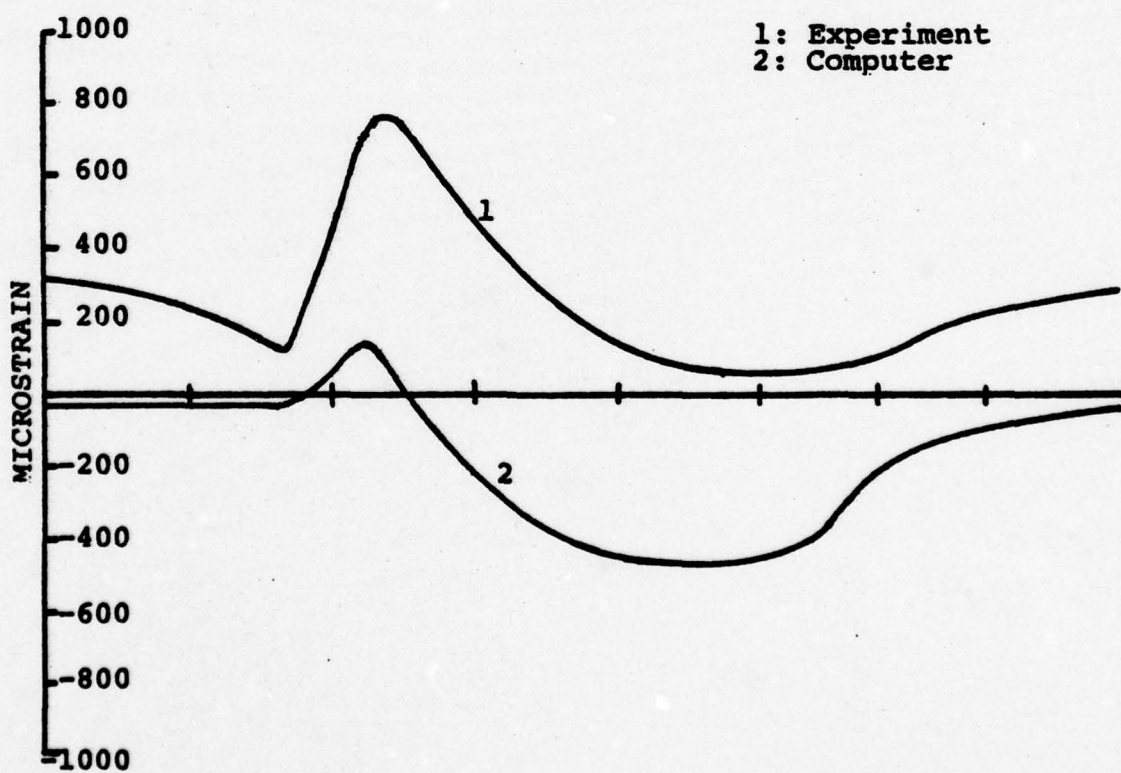
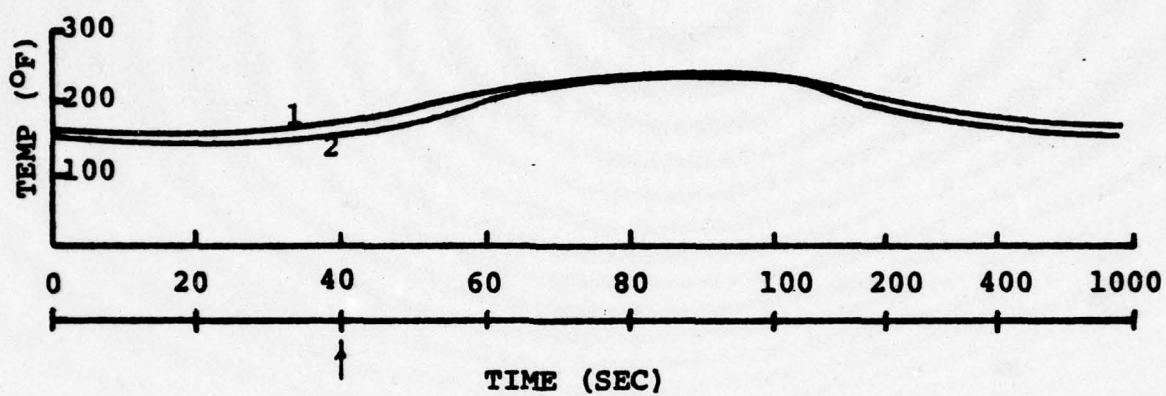


Figure 40 - HY-130 Specimen II, 1.5", Temperature and Strain Analytical Comparison, Pass 3

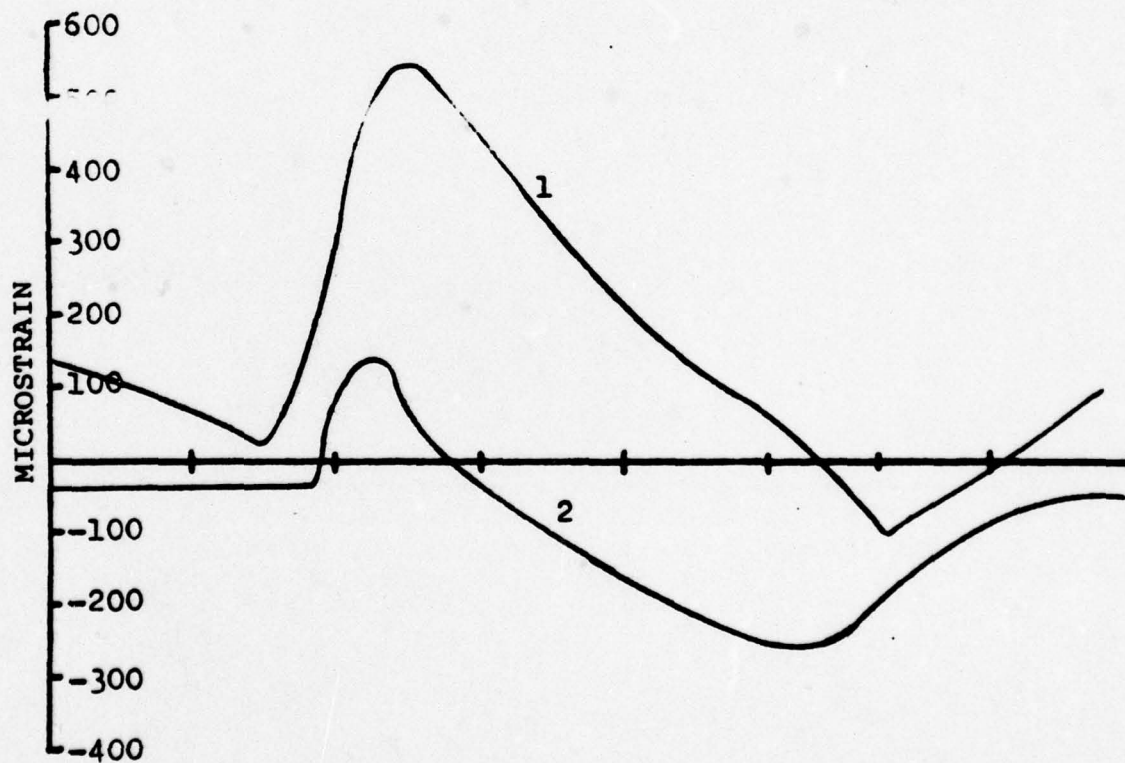
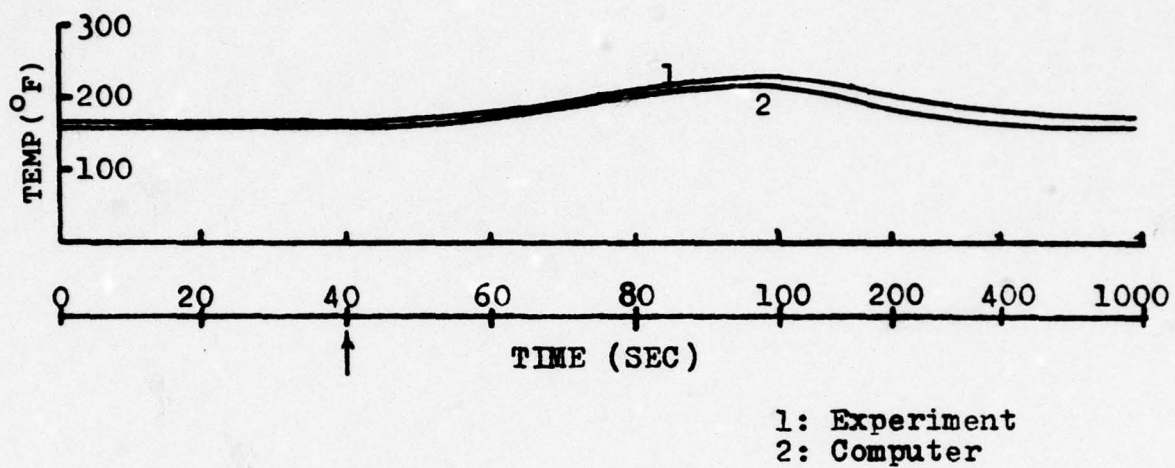
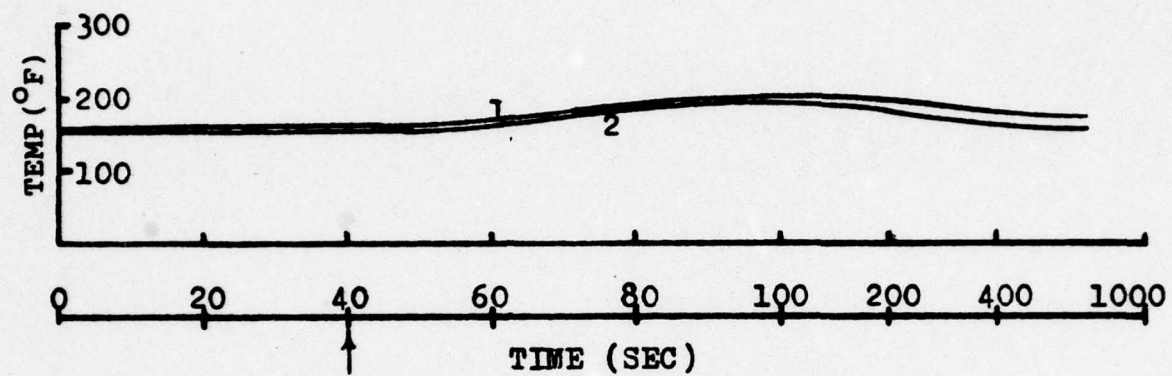


Figure 41 - HY-130 Specimen II, 2.0", Temperature and Strain Analytical Comparison, Pass 3



1: Experiment
2: Computer

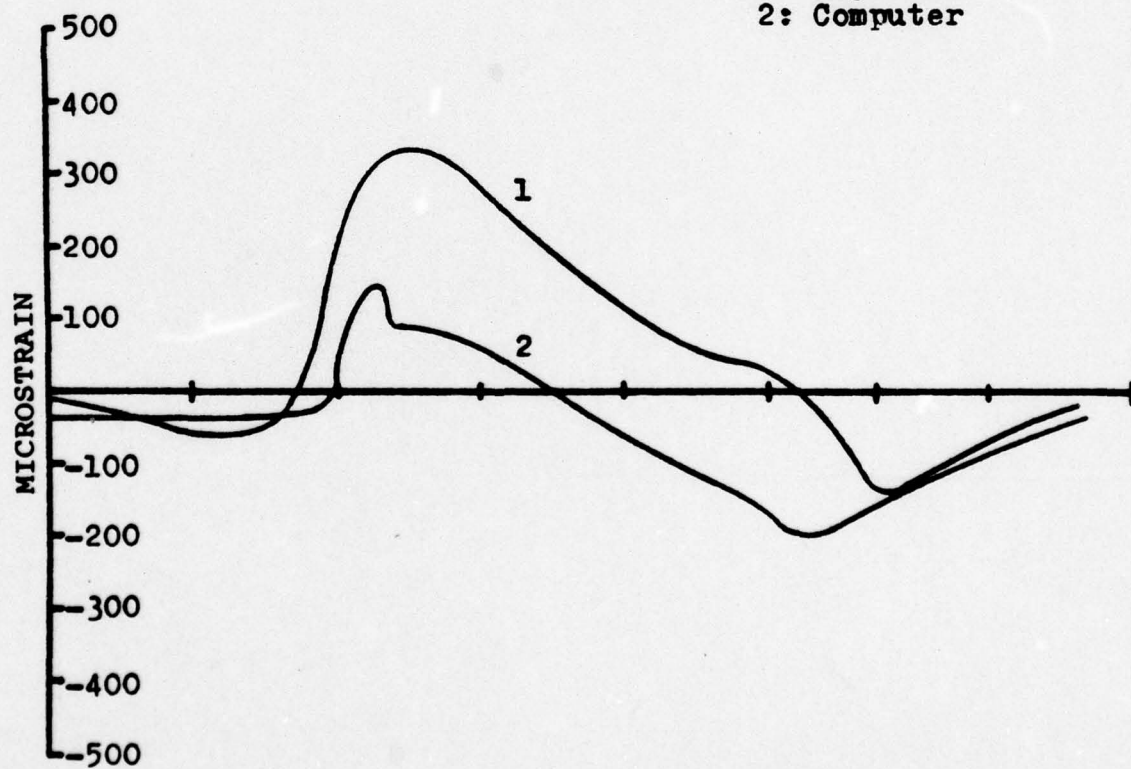
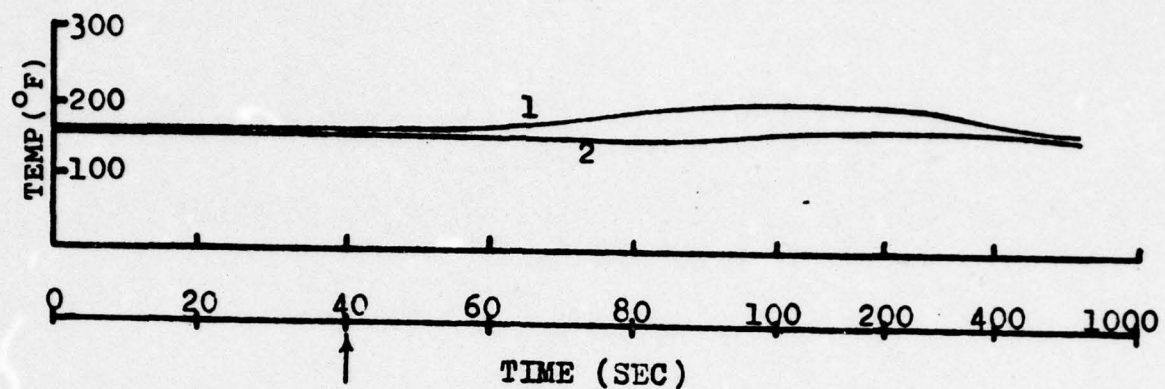


Figure 42 - HY-130 Specimen I, 2.25", Temperature and Strain Analytical Comparison, Pass 3



1: Experiment
2: Computer

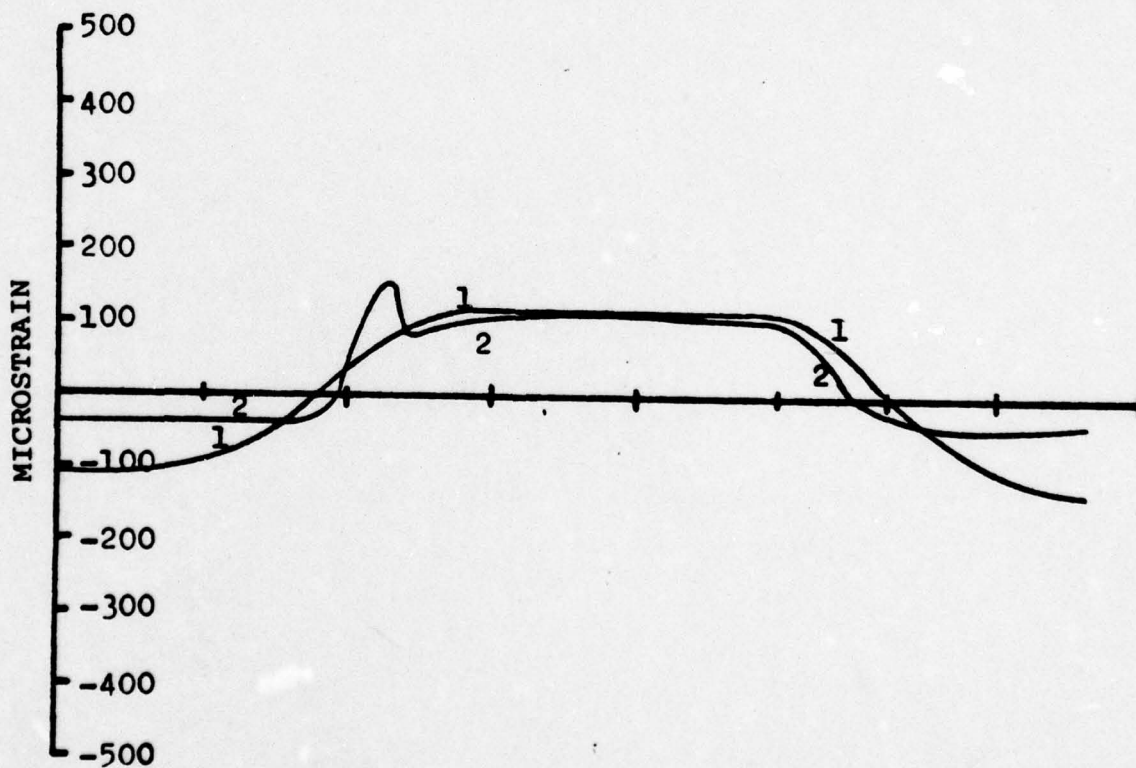


Figure 43 - HY-130 Specimen I, 4.25", Temperature and Strain Analytical Comparison, Pass 3

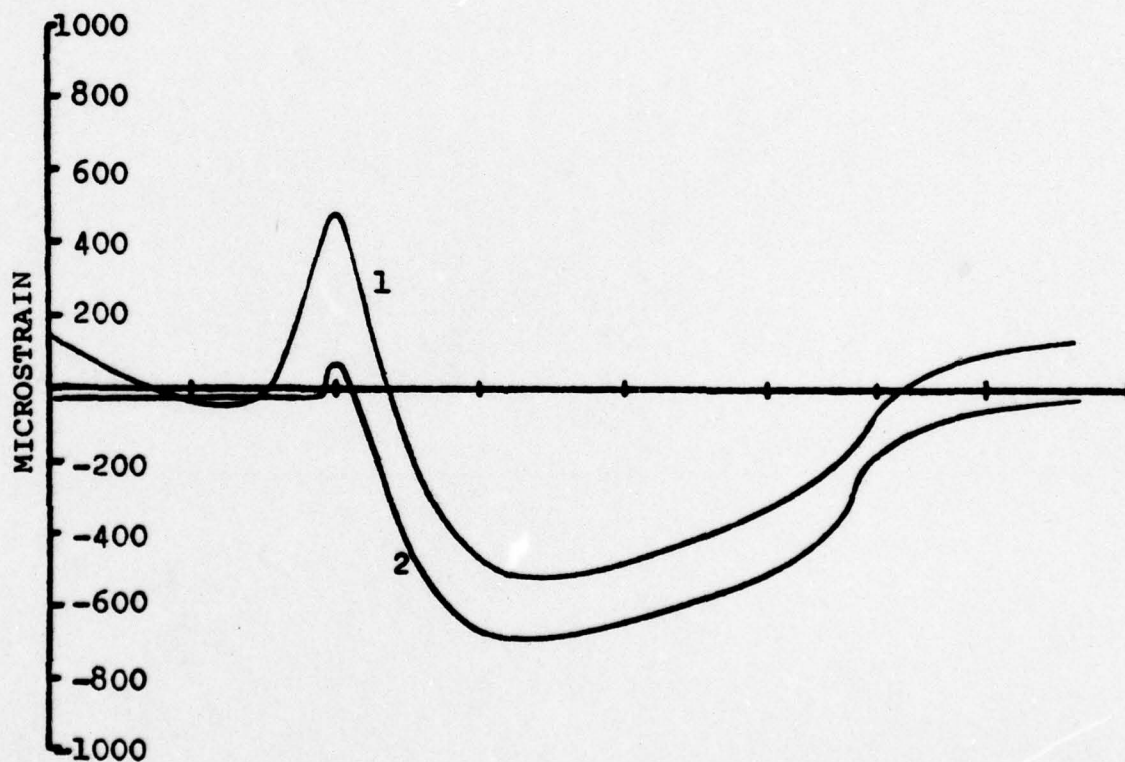
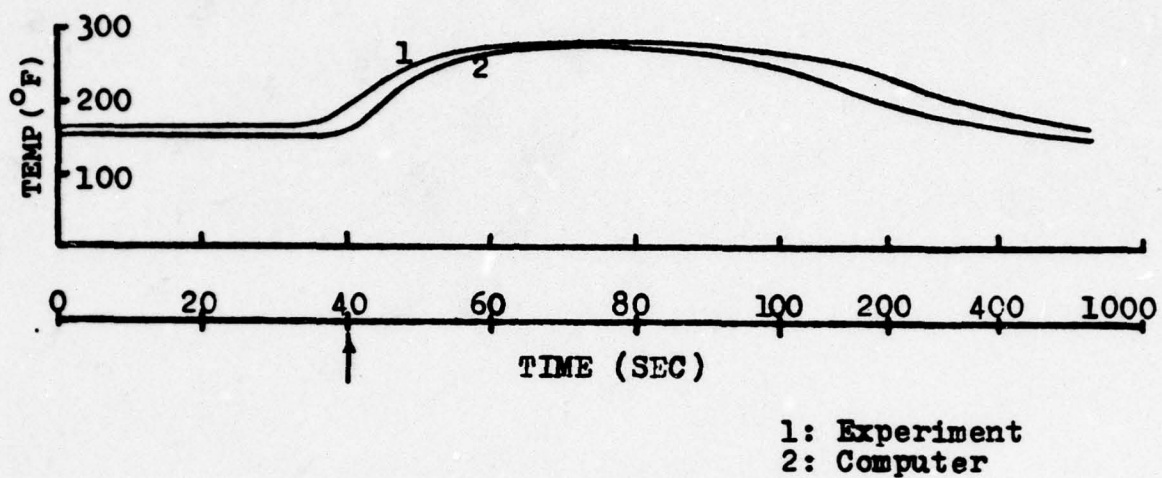


Figure 44 - 1020 Steel, 1.25", Temperature and Strain Analytical Comparison, Pass 3

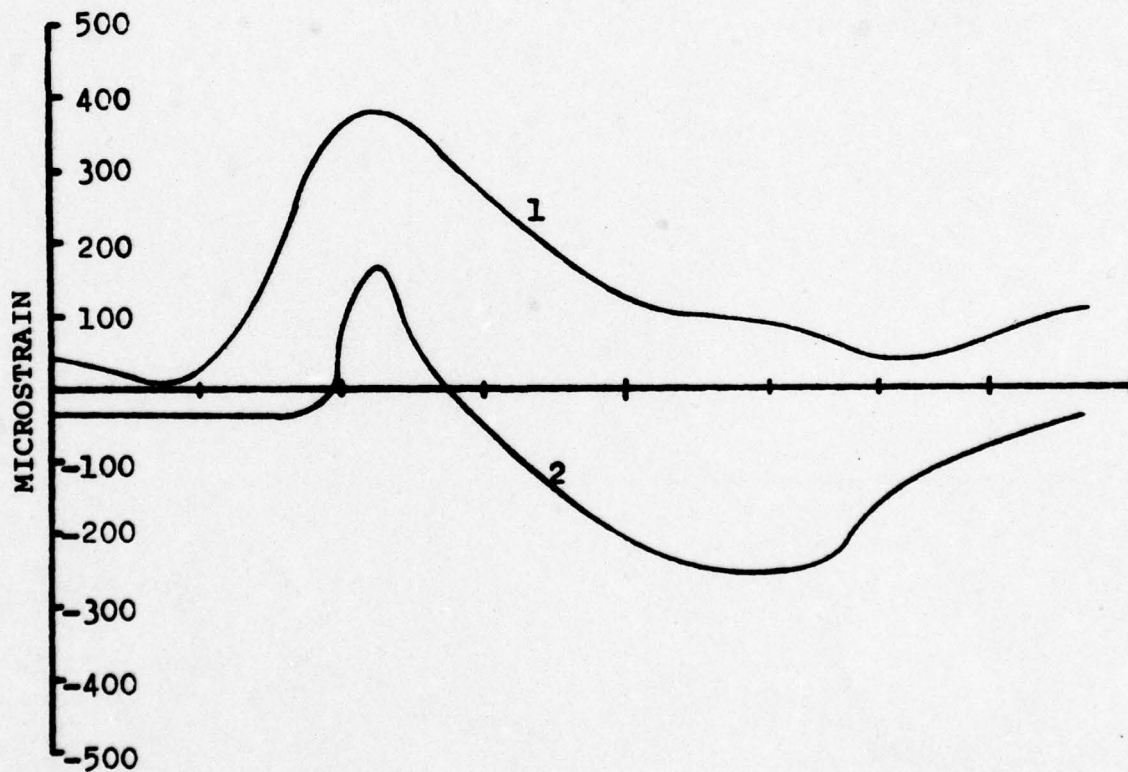
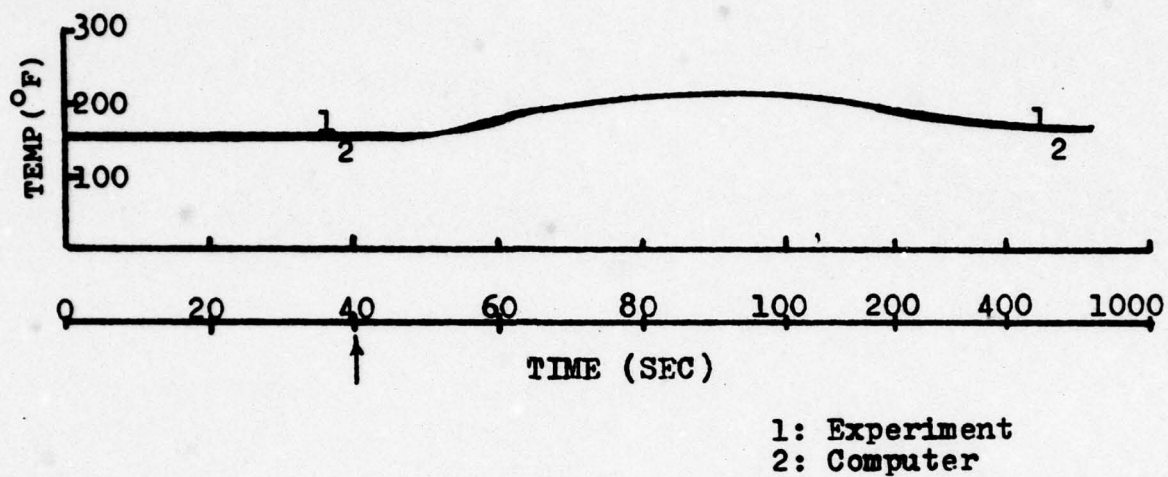


Figure 45 - 1020 Steel, 2.25", Temperature and Strain Analytical Comparison, Pass 3

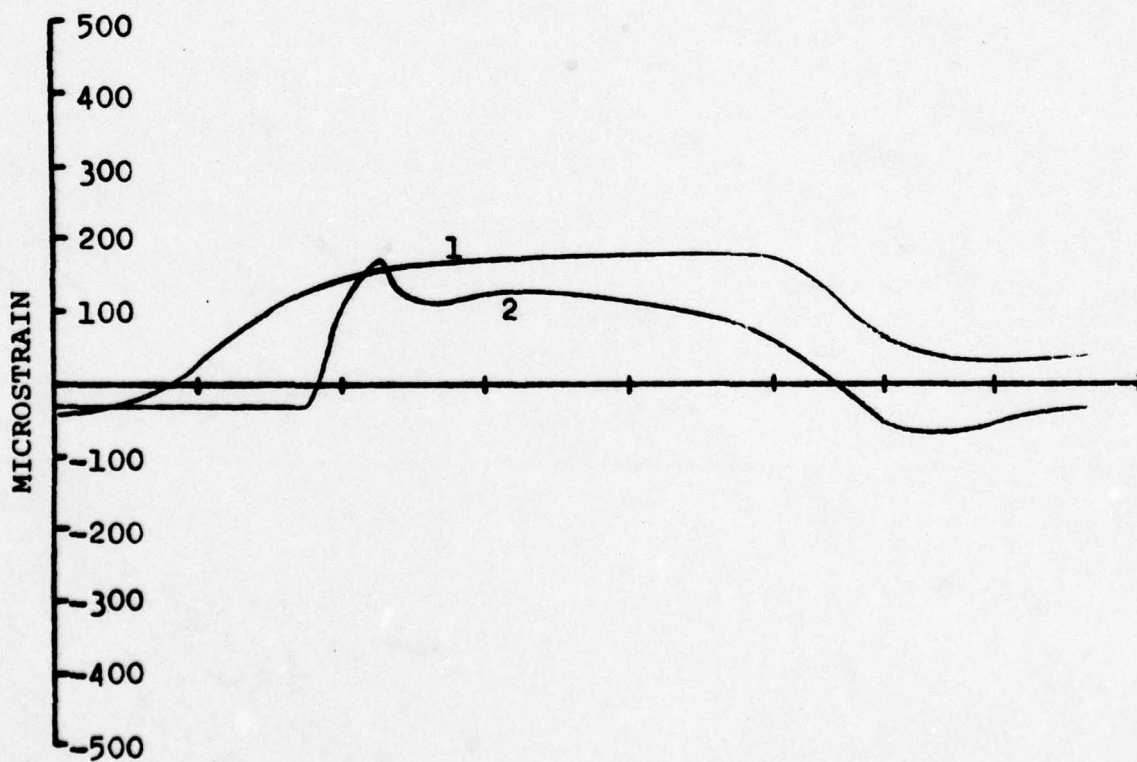
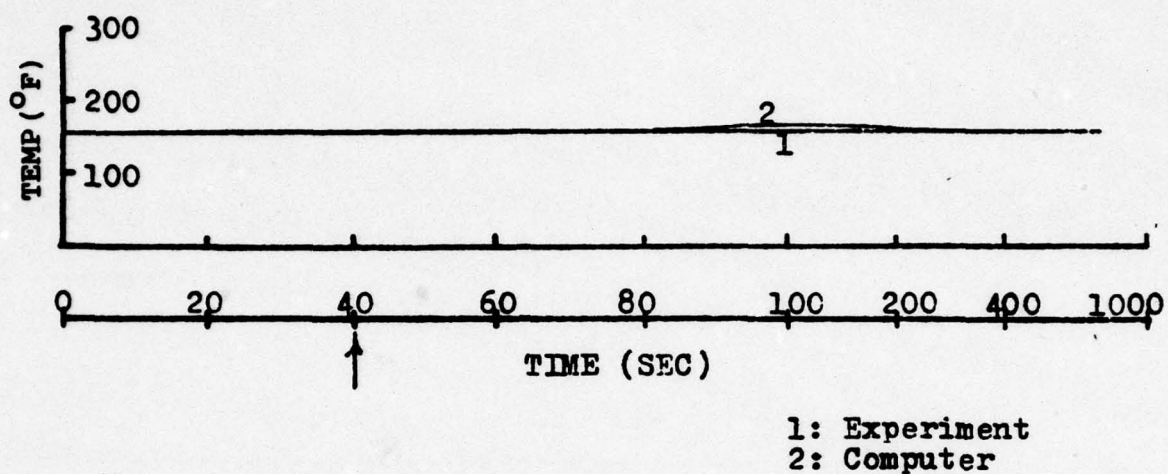


Figure 46 - 1020 Steel, 4.25", Temperature and Strain Analytical Comparison, Pass 3

CHAPTER V

DISCUSSION OF RESULTS

A. HY-130

In reviewing the results for HY-130, Specimen I shows almost identical results for each pass except for pass 2. After welding pass 1 on Specimen I, longitudinal cracks appeared along the fusion line between the bead and the base metal. They did not extend the entire length of the weld, but did exist in the vicinity of the instrumentation. This is the likely reason that the curves for pass 2 have not quite reached the characteristic shapes shown for passes 3-6. No cracks in the weld appeared following any passes except pass 1 on Specimen I. On Specimen I, where the measured strain at 1.25" from the weld line for passes 2 and 4 does not reach compressive strains as large as for passes 3, 5, and 6, it is felt that this is due to the slight movement of the arc from the prescribed weld line in order to fill the groove. As the arc was further from the points of measurement for passes 2 and 4 than for the other passes, the maximum temperature and strains reached were lower.

During the welding of Specimen II, no cracking occurred after any of the passes and the curves for strain measured at 1.0", 1.5", and 2.0" from the weld line exhibited a

characteristic shape immediately with pass 2, as shown in Figures 27 through 31. Great care was taken to fill the groove with minimal movement of the arc away from the center of the weld line. It is thought that this contributed to the relatively small variation in maximum tensile and compressive strains from one pass to the next.

Very interesting results occurred at 0.6" from the weld line on Specimen II, as shown in Figure 32. This location was the closest point of measurement to the arc and the first notable observation is that the strains which exist between passes reach very high levels of tensile strain. These strain levels are approximately four times the interpass strain levels measured at 1.0" from the weld line. The second notable aspect of the curves is the rapidity in which the strain changes from a smoothly decreasing tensile strain to a high tensile peak and then returns to a smoothly decreasing tensile strain for passes 2, 3, and 4 (not shown). This entire change takes place in less than half the time and covers a much larger total strain change than that measured at any other transverse position. Following these strain movements, pass 5 shows no tensile peak at all but rather the strain starts at a high tensile strain level, reaches a minimum, and returns to a high tensile strain level. As stated in the previous

section, data for pass 6 is unreliable due to the temperatures greatly exceeding the maximum allowable for the strain gage.

This behavior at 0.6" from the weld line resembles that reported by Klein [2] in his study on 3/4" thick HY-130 plate. He reported two tensile peaks at points 1.0" or closer to the weld line. The differences between these results and those of Klein are most likely caused by the fact that his specimens were highly restrained whereas the specimens in this study were unrestrained. Klein [2] attributes this behavior to the possibility that precipitates form in the fusion zone and weld metal upon solidification which will cause high tensile strains in the metal near the weld line. Stoop and Metzbower [16] recently reported that the microstructure in the heat affected zone of GMA weldments of HY-130 consisted of coarse grained Bainite close to the fusion zone and auto-tempered Martensite plus ferrite further away from the fusion zone. Outside the heat affected zone, the base metal remained tempered Martensite. More will be said on this later.

B. 1020 Steel

The results for 1020 steel closely resemble those for

HY-130 in terms of general shape of the curves of strain versus time. During welding of the first pass, there were areas of incomplete fusion and porosity. The second pass resulted in a complete, high quality bead. It is thought that the results shown for pass 2 reflect the low quality weld bead on the first pass and the results for the following passes show the characteristic strain behavior of a good weld in 1020 steel. The results measured at 6.25" from the weld line showed very little strain movement and are deleted from the figures.

C. Analytical Comparison

Figures 38 through 46 compare experimental results for temperature and longitudinal strain with one-dimensional computer program predictions for temperature and longitudinal strain. The results for pass 3 were arbitrarily chosen as they are entirely typical of the comparisons for the other passes.

Immediately apparent upon looking at the figures is that the temperature comparisons are very good whereas the strain comparisons are not very good in most cases. In calculating the temperature, the computer program treats the temperature distribution around the moving arc as a two-dimensional heat conduction problem. It appears that

this approach is adequate to describe the temperature distribution in the plates. Of interest in the results is that the arc efficiency used for calculating the temperature distribution was the same for both HY-130 and 1020 steel. This supports the contention that arc efficiency is only a function of the welding equipment used and not a function of the material being welded.

In analyzing strains, the one-dimensional program assumes that the longitudinal strain is only a function of the transverse distance from the weld line and the transverse strain as well as the shear strain are assumed to be zero. In fact, the transverse strains measured were not zero and for distances from the weld line of up to approximately one inch, the transverse strains were of the same order of magnitude as the longitudinal strains. At transverse distances of approximately two inches, transverse strains are greatly reduced, but still significant. Only at greater transverse distances do they become relatively insignificant. It is thought that the presence of these transverse strains accounts for the poor comparisons between the experimental results and the one-dimensional program predictions because the assumptions used in calculating the longitudinal strains are not valid in these one inch thick plates. However, it can be seen that the

results for 4.25" in both the HY-130 and 1020 steels agree more closely than for points closer to the weld line.

This appears to be due to the absence of any significant transverse strains this far from the weld line.

To summarize the computer results, treating the temperature distribution as a two-dimensional heat conduction problem is shown to be an adequate method to use in thick plates. However, in calculating longitudinal strains, the one-dimensional program is only accurate when there are insignificant transverse strains.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

In summary, the results of these experiments indicate that the following conclusions can be made.

(1) The use of electric resistance strain gages is an inexpensive, accurate, and convenient method of measuring transient thermal strains which occur during welding.

(2) The strain system which exists close to the weld line in HY-130 is extremely complex and not well understood. The strain results of this study at 0.6" from the weld line of an unrestrained butt weld tend to support the existence of the secondary tensile peaks in restrained butt welds as reported by Klein [7]. This behavior is not evident at distances greater than 1.0 inch from the weld line.

(3) The MIT computer program for the one-dimensional analysis of thermal stresses and metal movement during welding, which treats the temperature distribution surrounding the arc as a two-dimensional heat flow problem, accurately predicts the temperature distribution in one inch thick HY-130 and low carbon steel plates.

(4) The existence of large transverse strains invalidates the assumptions made by the one-dimensional computer

program in calculating the longitudinal strains close to the weld line in thick plates. Therefore, the usefulness of the one-dimensional program for predicting longitudinal strains in thick plates is very limited.

(5) The description by Masubuchi [10] of the strain changes occurring in the base metal near the weld as the arc goes by is validated by the results of this study. Figure 47 shows the longitudinal strain field for HY-130 at times thirty seconds before the passage of the arc, during the passage of the arc, and ten minutes after the passage of the arc for pass 3. These curves show that just before the passage of the arc, strains are small with compressive strains near the weld becoming tensile far away. At the moment of passage, most of the plate is in tension with metal near the weld line in compression. Then, ten minutes after the passage of the arc, high tensile strains exist near the weld, changing to compressive strains at points further than approximately two inches.

The results of this study create the desire to continue the work on these specimen plates. Recommendations for further study include the following.

(1) Compare the results with the predictions of a two-dimensional analysis of thermal stresses and metal movement.

(2) Conduct a residual stress analysis of the weldment.

(3) Conduct a metallurgical characterization study of the weldment to complement the study by Stoop and Metz-bower [14].

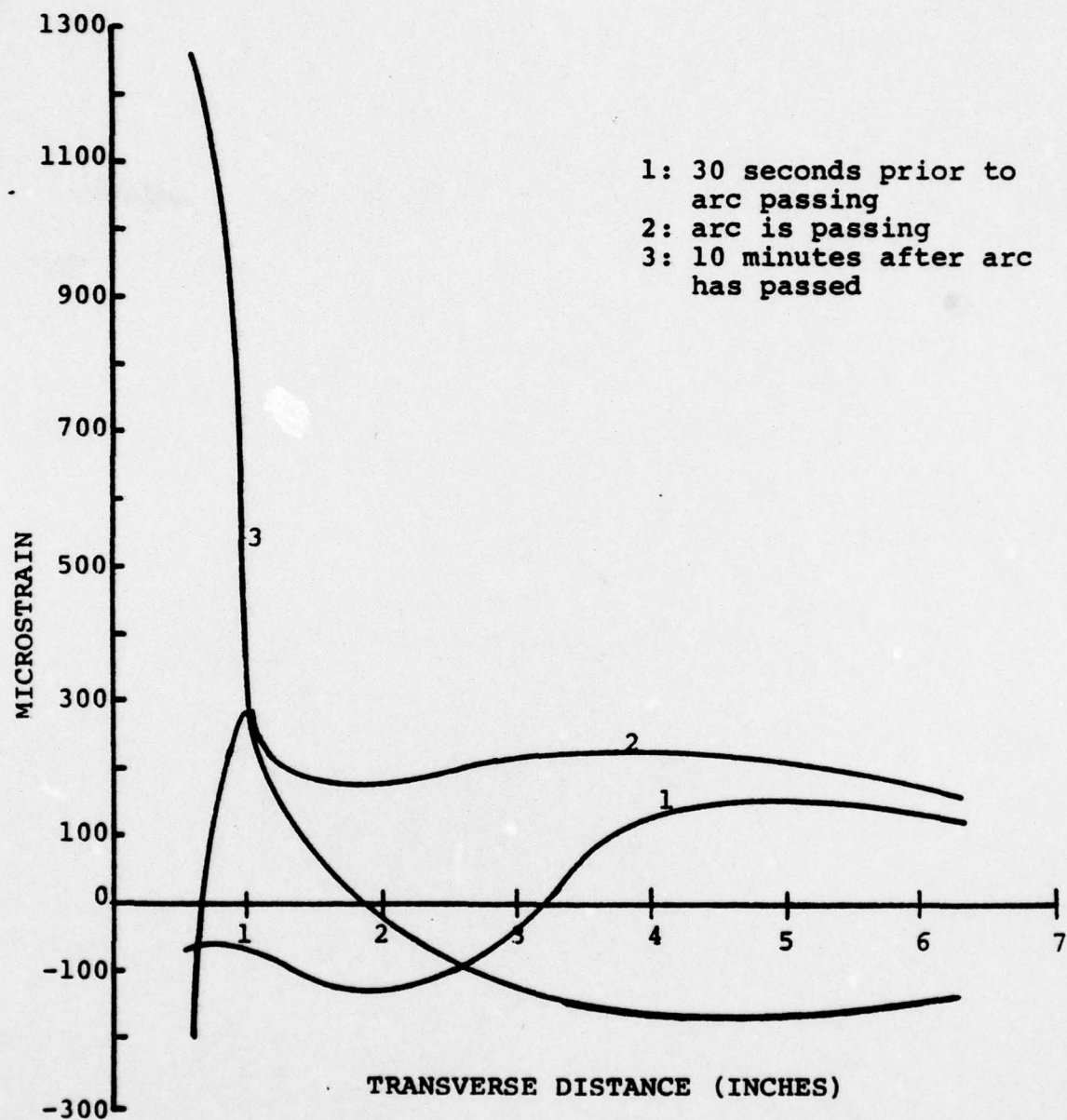


Figure 47 - Longitudinal Strain Field in HY-130, Pass 3

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APPENDIX

Analytical Predictions for HY-130 steel are presented.

TIME=	13.39	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	270.20	164.20	152.93	150.37	150.01	150.00	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.515	-0.765	0.042	0.113	0.126	0.114	0.077	0.022	-0.023	-0.068	0.000
PLASTIC STRAIN	-17.515	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.116	1.699	1.031	1.007	1.002	1.023	1.068	1.031	0.976	0.931	0.846
STRESS	0.0	-22.431	1.251	3.366	3.746	3.538	3.400	2.292	0.651	-0.083	-2.017
TIME=	14.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	310.75	173.50	155.58	151.22	150.03	150.01	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.489	-0.963	0.017	0.134	0.154	0.148	0.100	0.023	-0.030	-0.068	0.000
PLASTIC STRAIN	-17.489	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.150	1.142	1.126	1.120	1.108	1.102	1.054	0.982	0.924	0.866	0.800
STRESS	0.0	-20.099	0.512	3.996	4.701	4.501	4.434	2.972	0.947	-0.080	-2.608
TIME=	15.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	444.10	184.61	159.32	152.27	150.04	150.01	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.431	-1.103	0.327	0.141	0.182	0.175	0.113	0.034	-0.035	-0.104	0.000
PLASTIC STRAIN	-17.431	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.194	1.177	1.165	1.158	1.151	1.137	1.124	1.072	0.988	0.914	0.850
STRESS	0.0	-22.088	-0.792	4.187	5.410	5.428	5.223	3.527	1.009	-1.038	-3.085
TIME=	16.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	550.35	196.11	164.05	153.77	150.13	150.03	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.400	-1.197	-0.082	0.135	0.197	0.205	0.190	0.134	0.038	-0.117	0.000
PLASTIC STRAIN	-17.400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.225	1.245	1.192	1.184	1.176	1.166	1.152	1.047	0.992	0.915	0.847
STRESS	0.0	-24.730	-2.416	3.498	5.853	6.110	5.889	3.980	1.143	-1.163	-1.870
TIME=	17.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	661.43	207.79	169.52	155.77	150.24	150.05	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.375	-1.256	-0.140	0.118	0.204	0.224	0.216	0.146	0.042	-0.042	0.000
PLASTIC STRAIN	-17.375	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.250	1.229	1.215	1.206	1.197	1.179	1.170	1.130	0.996	0.911	0.847
STRESS	0.0	-26.383	-4.152	3.515	6.063	6.660	6.433	4.353	1.255	-1.263	-3.782
TIME=	18.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	766.30	216.56	175.46	158.22	150.41	150.10	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.354	-1.290	-0.198	0.095	0.204	0.239	0.231	0.157	0.045	-0.045	0.000
PLASTIC STRAIN	-17.354	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.271	1.248	1.233	1.224	1.214	1.195	1.186	1.110	0.999	0.939	0.818
STRESS	0.0	-27.334	-5.059	2.823	6.075	7.101	6.882	4.665	1.351	-1.344	-4.030
TIME=	19.00	INVOLVE MULTI-PASS EFFECT 1 PASS									
TEMPERATURE	2500.00	872.64	228.33	181.62	161.07	151.00	150.16	150.00	150.00	150.00	150.00
MECH. STRAIN	-17.336	-1.336	-0.252	0.068	0.195	0.248	0.244	0.166	0.048	-0.048	0.000
PLASTIC STRAIN	-17.336	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.299	1.265	1.249	1.239	1.229	1.209	1.199	1.119	1.002	0.904	0.811
STRESS	0.0	-27.785	-7.447	2.004	5.931	7.368	7.259	4.932	1.405	-1.409	-4.253

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TIME= 20.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 2500.00 275.02 246.80 187.79 151.47 150.26 150.00 150.00 150.00 150.00
 MECH. STRAIN -17.322 -1.311 -0.301 0.037 0.190 0.256 0.173 0.051 -0.044 -0.169
 PLASTIC STRAIN -17.322 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.303 1.279 1.462 1.252 1.241 1.220 1.127 1.304 1.975 0.835
 STRESS 0.0 -37.094 -0.860 1.106 5.650 7.632 7.566 5.157 1.506 -1.462 -0.833

TIME= 30.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMP DOSS NOT CONVERGUE J= 1 TR,TO,FR= 1994.03 2376.29 1623.76***** USED TR *****
 TEMPERATURE 1994.03 363.28 276.30 232.31 197.00 162.24 155.49 150.33 150.00 150.00
 MECH. STRAIN -12.167 -1.906 -0.793 -0.459 -0.214 0.036 0.080 0.117 0.117 0.117
 PLASTIC STRAIN -14.958 3.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.071 1.071 1.071 1.071 1.071 1.071 1.071 1.071 1.071 1.071
 STRESS 1.700 -0.763 -24.256 -13.535 -6.327 0.997 2.372 3.486 3.487 3.487

TIME= 40.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 1669.62 335.34 284.84 248.46 218.10 176.60 165.39 150.02 150.00 150.00
 MECH. STRAIN -10.437 -1.409 -0.817 -0.566 -0.348 -0.056 0.024 0.127 0.127 0.127
 PLASTIC STRAIN -12.543 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.080 1.080 1.080 1.080 1.080 1.080 1.080 1.080 1.080 1.080
 STRESS 7.854 -35.151 -23.939 -16.653 -10.287 -1.600 0.750 3.770 3.773 3.773

TIME= 50.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 712.02 318.28 277.72 251.88 227.16 187.85 174.55 150.10 150.00 150.00
 MECH. STRAIN -4.267 -1.054 -0.783 -0.594 -0.416 -0.138 -0.045 0.123 0.123 0.123
 PLASTIC STRAIN -8.506 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077
 STRESS 114.489 -20.739 -22.940 -17.473 -12.266 -6.079 -1.337 3.653 3.674 3.674

TIME= 60.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 458.48 297.02 270.08 250.18 230.11 195.22 181.89 150.35 150.00 150.00
 MECH. STRAIN -2.161 -0.926 -0.727 -0.582 -0.437 -0.193 0.121 0.123 0.123 0.123
 PLASTIC STRAIN -6.688 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077 1.077
 STRESS 129.359 -27.072 -21.341 -17.119 -12.900 -5.618 -2.864 3.588 3.659 3.659

TIME= 70.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 323.68 282.76 264.08 246.29 229.94 199.56 187.31 151.15 150.00 150.00
 MECH. STRAIN -1.126 -0.822 -0.676 -0.555 -0.437 0.114 0.114 0.122 0.122 0.122
 PLASTIC STRAIN -5.726 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.075 1.075 1.075 1.075 1.075 1.075 1.075 1.075 1.075 1.075
 STRESS 133.841 -26.075 -19.605 -16.346 -12.497 -6.559 -3.561 3.386 3.619 3.619

TIME= 80.00 INVOLVE MULTI-PASS EFFECT 1 PASS
 TEMPERATURE 206.35 270.71 258.80 241.62 228.05 201.80 190.31 152.03 150.00 150.00
 MECH. STRAIN -0.587 -0.736 -0.617 -0.524 -0.427 0.135 0.119 0.119 0.119 0.119
 PLASTIC STRAIN -5.218 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 1.073 1.073 1.073 1.073 1.073 1.073 1.073 1.073 1.073 1.073
 STRESS 130.249 -21.603 -18.135 -15.838 -12.584 -7.099 -4.718 3.128 3.543 3.543

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TIME= 400.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	167.82	167.75	160.93	160.44	165.25	164.57	156.38	151.19	150.31	150.06
TECH. STRAIN	0.00	-0.049	-0.066	-0.063	-0.079	-0.071	-0.066	-0.024	0.020	0.031	0.033
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
STRESS	100.000	-2.617	-2.541	-2.456	-2.355	-2.112	-1.973	-0.712	0.586	0.926	0.977

TIME= 450.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	166.04	163.71	163.42	163.07	162.23	161.75	157.19	152.31	150.43	150.10
TECH. STRAIN	0.020	-0.070	-0.069	-0.066	-0.063	-0.057	-0.054	-0.021	0.017	0.023	0.025
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STRESS	100.000	-2.076	-2.009	-1.949	-1.878	-1.707	-1.608	-0.602	0.371	0.696	0.757

TIME= 500.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	161.13	160.49	160.08	160.43	159.83	159.48	156.11	151.94	150.44	150.15
TECH. STRAIN	0.020	-0.056	-0.054	-0.053	-0.051	-0.047	-0.044	-0.021	0.017	0.017	0.017
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
STRESS	100.000	-1.659	-1.611	-1.568	-1.517	-1.394	-1.323	-0.637	0.204	0.535	0.571

TIME= 550.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	158.86	158.69	158.54	158.46	157.92	157.64	155.14	151.82	150.54	150.19
TECH. STRAIN	0.015	-0.045	-0.044	-0.043	-0.042	-0.039	-0.037	-0.020	0.003	0.012	0.014
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
STRESS	100.000	-1.344	-1.309	-1.279	-1.242	-1.151	-1.100	-0.587	0.087	0.346	0.416

TIME= 600.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	157.09	156.96	156.85	156.72	156.29	156.20	154.10	151.66	150.55	150.24
TECH. STRAIN	0.011	-0.037	-0.036	-0.036	-0.035	-0.032	-0.031	-0.014	-0.003	0.003	0.010
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
STRESS	100.000	-1.106	-1.080	-1.058	-1.031	-0.964	-0.926	-0.540	-0.065	0.220	0.284

TIME= 650.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	155.49	155.59	155.51	155.42	155.17	155.03	153.59	151.50	150.55	150.27
TECH. STRAIN	0.004	-0.031	-0.030	-0.030	-0.029	-0.028	-0.027	-0.017	-0.002	0.004	0.006
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STRESS	100.000	-0.924	-0.905	-0.888	-0.869	-0.819	-0.790	-0.498	-0.074	0.118	0.175

TIME= 700.00 INVOLVE MULTI-PASS EFFECT 1 PASS

TEMPERATURE	150.00	154.50	154.51	154.45	154.37	154.19	154.04	152.29	151.13	150.53	150.29
TECH. STRAIN	0.005	-0.026	-0.026	-0.025	-0.025	-0.024	-0.023	-0.016	-0.004	0.001	0.003
PLASTIC STRAIN	-0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STRESS	100.000	-0.784	-0.770	-0.758	-0.743	-0.706	-0.684	-0.462	-0.125	0.016	0.044

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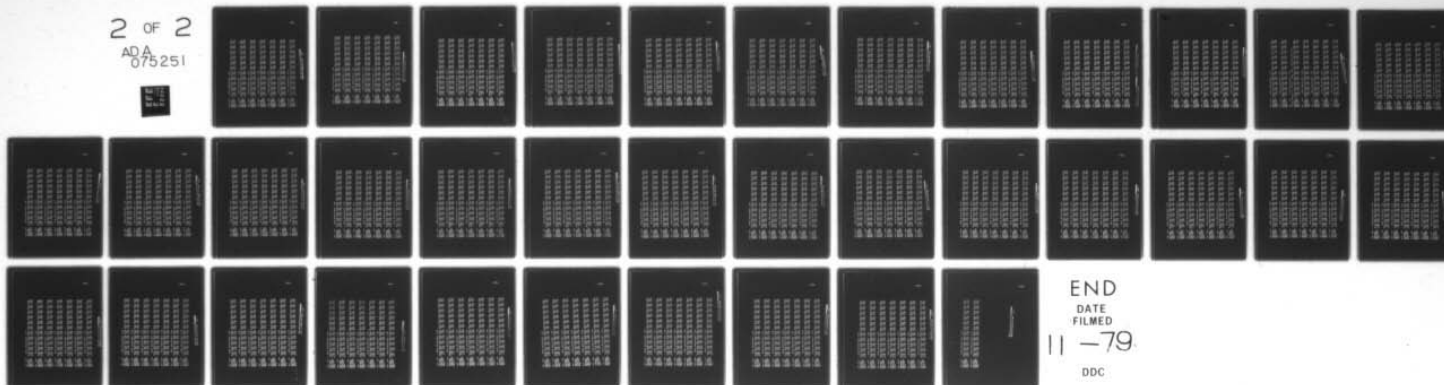
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TIME= 0.0 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 1.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 2.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 3.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 4.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 5.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

TIME= 6.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	150.00	151.30	151.20	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.314	-0.023	-0.023	-0.023	-0.023	-0.022	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.442	-0.681	-0.678	-0.675	-0.673	-0.665	-0.661	-0.613	-0.531	-0.500	-0.476

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TIME= 7.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	151.66	151.32	151.28	151.27	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.025	-0.043	-0.023	-0.023	-0.023	-0.024	-0.022	-0.021	-0.016	-0.017	-0.016
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.084	-0.043	-0.023	-0.023	-0.023	-0.024	-0.022	-0.021	-0.016	-0.017	-0.016
STRESS	179.303	0.665	-0.077	-0.675	-0.672	-0.664	-0.660	-0.612	-0.533	-0.499	-0.475

TIME= 8.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	179.50	151.54	151.30	151.28	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.216	-0.040	-0.022	-0.022	-0.022	-0.021	-0.021	-0.020	-0.017	-0.016	-0.015
PLASTIC STRAIN	-0.059	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.275	-0.040	-0.022	-0.022	-0.022	-0.021	-0.021	-0.020	-0.017	-0.016	-0.015
STRESS	133.000	-0.706	-0.654	-0.640	-0.645	-0.637	-0.633	-0.545	-0.503	-0.472	-0.448

TIME= 9.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	602.00	150.46	151.40	151.29	151.26	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-0.449	-0.049	-0.009	-0.007	-0.007	-0.007	-0.007	-0.005	-0.002	-0.001	-0.001
PLASTIC STRAIN	-0.449	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.898	-0.049	-0.009	-0.007	-0.007	-0.007	-0.007	-0.005	-0.002	-0.001	-0.001
STRESS	30.559	-0.004	-0.244	-0.222	-0.216	-0.208	-0.203	-0.156	-0.073	-0.043	-0.019

TIME= 10.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	2500.00	100.49	151.14	151.35	151.27	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-17.507	-0.020	0.070	0.075	0.076	0.076	0.076	0.074	0.081	0.082	0.083
PLASTIC STRAIN	-17.507	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.014	-0.020	0.070	0.075	0.076	0.076	0.076	0.074	0.081	0.082	0.083
STRESS	0.0	-0.001	2.083	2.242	2.259	2.269	2.273	2.321	2.403	2.434	2.458

TIME= 11.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	2500.00	190.29	154.07	151.57	151.31	151.22	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-17.576	-0.225	0.067	0.084	0.086	0.087	0.087	0.080	0.091	0.092	0.093
PLASTIC STRAIN	-17.576	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.152	-0.225	0.067	0.084	0.086	0.087	0.087	0.080	0.091	0.092	0.093
STRESS	0.0	-0.672	1.996	2.505	2.559	2.575	2.580	2.627	2.710	2.741	2.765

TIME= 12.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	2500.00	230.70	150.28	152.50	151.40	151.23	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-17.561	-0.512	0.054	0.093	0.101	0.102	0.102	0.104	0.106	0.107	0.108
PLASTIC STRAIN	-17.561	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.122	-0.512	0.054	0.093	0.101	0.102	0.102	0.104	0.106	0.107	0.108
STRESS	0.0	-15.090	1.599	2.758	2.997	3.033	3.034	3.085	3.168	3.199	3.223

TIME= 13.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	2500.00	279.52	165.29	154.20	151.62	151.23	151.20	150.97	150.56	150.41	150.29
MECH. STRAIN	-17.545	-0.793	0.021	0.097	0.115	0.116	0.116	0.119	0.122	0.123	0.124
PLASTIC STRAIN	-17.545	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.090	-0.793	0.021	0.097	0.115	0.116	0.116	0.119	0.122	0.123	0.124
STRESS	0.0	-23.256	0.637	2.807	3.421	3.503	3.507	3.554	3.637	3.668	3.692

TIME 30.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	1491.70	361.46	274.53	233.56	199.06	163.46	156.89	150.97	150.56	150.41	150.29
MECH. STRAIN	-10.501	-1.812	-0.799	-0.465	-0.213	0.328	0.075	0.116	0.117	0.118	0.114
PLASTIC STRAIN	-11.219	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074
STRESS	16.031	-40.908	-23.424	-13.762	-6.491	0.843	2.223	3.387	3.670	3.500	3.525

TIME 40.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	1034.51	334.63	284.04	249.70	219.42	177.42	166.29	156.98	150.56	150.41	150.29
MECH. STRAIN	-7.257	-1.223	-0.832	-0.580	-0.363	-0.370	0.010	0.115	0.117	0.118	0.117
PLASTIC STRAIN	-11.944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075
STRESS	82.465	-35.577	-24.365	-17.078	-10.711	-2.376	0.289	3.409	3.695	3.525	3.550

TIME 50.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	789.74	315.52	274.96	251.12	228.39	189.07	175.75	151.07	150.56	150.41	150.29
MECH. STRAIN	-4.595	-1.065	-0.794	-0.605	-0.427	-0.168	-0.056	0.114	0.117	0.118	0.119
PLASTIC STRAIN	-4.485	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075
STRESS	111.844	-31.069	-22.277	-17.801	-12.542	-4.396	-1.650	3.391	3.495	3.525	3.549

TIME 60.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	574.54	294.24	271.23	251.34	231.14	196.43	183.09	151.32	150.56	150.41	150.29
MECH. STRAIN	-1.119	-0.938	-0.739	-0.594	-0.449	-0.231	-0.104	0.111	0.116	0.117	0.118
PLASTIC STRAIN	-7.344	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074	1.074
STRESS	122.127	-27.421	-21.688	-17.864	-13.243	-5.953	-3.194	3.309	3.443	3.493	3.518

TIME 70.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	465.75	284.02	263.33	247.53	231.14	200.77	188.21	152.11	150.56	150.41	150.29
MECH. STRAIN	-2.224	-0.844	-0.682	-0.568	-0.449	-0.233	-0.185	0.104	0.115	0.116	0.116
PLASTIC STRAIN	-6.745	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072	1.072
STRESS	124.719	-28.419	-20.046	-16.765	-13.253	-6.907	-4.304	3.094	3.409	3.440	3.464

TIME 80.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	344.12	274.04	255.66	242.87	229.29	203.01	191.51	152.97	150.56	150.41	150.29
MECH. STRAIN	-1.549	-0.749	-0.629	-0.537	-0.439	-0.252	-0.171	0.095	0.112	0.113	0.114
PLASTIC STRAIN	-6.160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069
STRESS	131.977	-21.974	-16.504	-15.884	-12.944	-7.455	-5.069	2.937	3.325	3.356	3.380

TIME 90.00 INVOLVE MULTI-PASS EFFECT 2 PASS

TEMPERATURE	224.14	261.79	244.52	237.99	226.61	203.42	193.43	153.97	150.56	150.41	150.29
MECH. STRAIN	-1.140	-0.677	-0.541	-0.505	-0.423	-0.261	-0.188	0.045	0.104	0.110	0.110
PLASTIC STRAIN	-7.334	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066
STRESS	133.412	-19.896	-17.090	-16.871	-12.440	-7.720	-5.563	2.537	3.235	3.261	3.285

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TIME=	100-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	200.46	252.23	491.90	233.17	221.55	203.70	194.37	155.05	150.56	150.41	150.29
MCH. STRAIN	-0.820	-0.616	-0.517	-0.473	-0.405	-0.263	-0.198	0.076	0.105	0.106	0.137
PLASTIC STRAIN	-5.435	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.363	1.063	1.063	1.063	1.363	1.363	1.363	1.363	1.363	1.363	1.363
STRESS	132.221	-14.122	-15.012	-13.959	-11.940	-7.190	-5.356	2.215	3.126	3.154	3.162

TIME=	150-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	103.02	221.07	216.65	212.95	207.68	197.00	191.63	150.75	150.68	150.41	150.29
MCH. STRAIN	-0.102	-0.809	-0.173	-0.343	-0.310	-0.235	-0.197	0.024	0.066	0.088	0.089
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.045	1.045	1.045	1.045	1.045	1.045	1.045	1.045	1.045	1.045	1.045
STRESS	136.591	-12.076	-11.027	-10.150	-9.154	-6.953	-5.824	0.725	2.570	2.624	2.604

TIME=	200-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	159.41	202.50	199.03	197.53	194.80	188.57	185.23	161.90	151.31	153.42	150.29
MCH. STRAIN	0.009	-0.291	-0.271	-0.255	-0.236	-0.192	-0.169	-0.068	0.067	0.071	0.072
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.367	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027	1.027
STRESS	183.865	-8.606	-8.036	-7.552	-6.951	-5.703	-5.013	-0.244	1.987	2.107	2.133

TIME=	250-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	152.72	189.84	188.18	186.76	185.36	181.10	179.00	162.32	151.66	150.46	150.29
MCH. STRAIN	0.301	-0.216	-0.200	-0.194	-0.182	-0.155	-0.140	-0.025	0.048	0.056	0.057
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013	1.013
STRESS	190.503	-6.386	-6.043	-5.749	-5.494	-4.597	-4.151	-0.736	1.432	1.677	1.710

TIME=	300-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	150.01	180.71	179.66	178.74	177.68	175.10	173.66	161.66	152.11	150.53	150.30
MCH. STRAIN	0.002	-0.164	-0.157	-0.150	-0.143	-0.125	-0.115	-0.032	0.033	0.044	0.045
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
STRESS	184.556	-4.868	-4.650	-4.461	-4.243	-3.710	-3.418	-0.945	0.977	1.298	1.304

TIME=	350-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	150.24	174.08	173.18	172.77	172.33	170.28	169.23	160.57	152.40	150.62	150.32
MCH. STRAIN	0.035	-0.144	-0.123	-0.119	-0.114	-0.102	-0.095	-0.035	0.021	0.033	0.035
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991
STRESS	144.375	-3.007	-3.664	-3.538	-3.368	-3.329	-2.826	-1.046	0.614	0.975	1.037

TIME=	400-00	INVOLE	MULTI-PASS	EFFECT	2 PASS						
TEMPERATURE	150.46	169.12	160.68	160.21	167.70	166.47	165.77	159.15	152.55	150.12	150.35
MCH. STRAIN	0.327	-0.102	-0.099	-0.096	-0.093	-0.084	-0.079	-0.035	0.011	0.024	0.026
PLASTIC STRAIN	-4.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962	0.962
STRESS	144.131	-3.044	-2.945	-2.858	-2.753	-2.503	-2.460	-1.053	0.332	0.702	0.742

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TIME= 450.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.07	165.34	164.99	164.69	164.33	163.45	162.95	158.16	152.57	150.41	150.39	
MECH. STRAIN		0.021	-0.004	-0.061	-0.079	-0.077	-0.071	-0.067	-0.034	0.004	0.016	0.019	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	
STRESS		143.940	-2.403	-2.412	-2.351	-2.277	-2.097	-1.994	-1.020	0.116	0.472	0.557	
TIME= 500.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.03	162.43	162.10	161.96	161.70	161.05	160.44	157.07	152.50	150.41	153.44	
MECH. STRAIN		0.015	-0.069	-0.060	-0.066	-0.064	-0.060	-0.057	-0.033	-0.002	0.009	0.012	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	
STRESS		143.702	-2.004	-2.014	-1.969	-1.915	-1.704	-1.708	-0.974	-0.064	0.281	0.372	
TIME= 550.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.01	160.16	159.98	159.82	159.62	159.14	158.06	156.11	152.18	150.55	153.44	
MECH. STRAIN		0.011	-0.059	-0.056	-0.056	-0.055	-0.052	-0.050	-0.031	-0.006	0.034	0.007	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	0.964	
STRESS		143.639	-1.749	-1.712	-1.678	-1.639	-1.541	-1.484	-0.924	-0.167	0.122	0.217	
TIME= 600.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.00	158.39	158.25	158.11	157.96	157.61	157.40	155.27	152.22	150.96	150.52	
MECH. STRAIN		0.006	-0.051	-0.050	-0.049	-0.048	-0.046	-0.044	-0.030	-0.009	0.000	0.033	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	
STRESS		143.510	-1.511	-1.482	-1.457	-1.427	-1.351	-1.310	-0.870	-0.258	-0.034	0.045	
TIME= 650.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.00	156.99	156.88	156.79	156.67	156.39	156.23	154.56	152.35	150.96	150.56	
MECH. STRAIN		0.003	-0.045	-0.044	-0.043	-0.043	-0.041	-0.039	-0.020	-0.011	-0.004	-0.001	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	0.957	
STRESS		143.415	-1.328	-1.307	-1.288	-1.265	-1.208	-1.175	-0.835	-0.327	-0.105	-0.024	
TIME= 700.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.00	155.40	155.35	155.32	155.21	155.41	155.28	153.96	151.49	150.98	150.58	
MECH. STRAIN		0.003	-0.040	-0.039	-0.039	-0.038	-0.037	-0.036	-0.027	-0.013	-0.006	-0.004	
PLASTIC STRAIN		-4.816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	0.954	
STRESS		143.330	-1.108	-1.172	-1.157	-1.139	-1.094	-1.066	-0.790	-0.379	-0.187	-0.115	
TIME= 750.00		INVOLVE MULTI-PASS EFFECT 2 PASS											
TEMPERATURE		150.00	154.49	154.93	154.87	154.80	154.62	154.52	153.45	151.73	150.91	150.46	
MECH. STRAIN		-0.302	-3.026	-0.335	-0.035	-0.035	-0.033	-0.033	-0.025	-0.014	-0.006	-0.004	
PLASTIC STRAIN		-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN		0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	
STRESS		139.029	-1.060	-1.053	-1.041	-1.027	-0.991	-0.971	-0.753	-0.404	-0.219	-0.146	

TIME= 000.00		INVOLVE MULTI-PASS EFFECT 2 PASS									
TEMPERATURE	150.00	154.24	154.23	154.19	154.13	153.94	153.90	153.92	151.98	150.84	150.61
MECH. STRAIN	-0.364	-0.033	-0.032	-0.032	-0.031	-0.031	-0.030	-0.024	-0.014	-0.010	-0.008
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.336	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
STRESS	139.772	-0.983	-0.970	-0.960	-0.948	-0.936	-0.923	-0.911	-0.898	-0.885	-0.872
TIME= 450.00		INVOLVE MULTI-PASS EFFECT 2 PASS									
TEMPERATURE	150.00	153.72	153.67	153.64	153.59	153.47	153.40	152.67	151.44	150.84	150.61
MECH. STRAIN	-0.365	-0.031	-0.030	-0.030	-0.030	-0.029	-0.029	-0.024	-0.015	-0.011	-0.010
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.335	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969	0.969
STRESS	139.721	-0.915	-0.907	-0.899	-0.889	-0.885	-0.871	-0.851	-0.833	-0.822	-0.815
TIME= 100.00		INVOLVE MULTI-PASS EFFECT 2 PASS									
TEMPERATURE	150.00	153.26	153.23	153.19	153.15	153.06	153.00	152.38	151.12	150.44	150.60
MECH. STRAIN	-0.367	-0.029	-0.029	-0.028	-0.028	-0.028	-0.027	-0.023	-0.016	-0.013	-0.011
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.333	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
STRESS	139.683	-0.861	-0.854	-0.847	-0.839	-0.834	-0.827	-0.802	-0.787	-0.780	-0.772
TIME= 950.00		INVOLVE MULTI-PASS EFFECT 2 PASS									
TEMPERATURE	150.00	152.89	152.86	152.84	152.80	152.72	152.67	152.12	151.21	150.85	150.59
MECH. STRAIN	-0.368	-0.024	-0.027	-0.027	-0.027	-0.026	-0.026	-0.022	-0.016	-0.014	-0.012
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.332	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
STRESS	139.646	-0.821	-0.815	-0.809	-0.803	-0.795	-0.775	-0.767	-0.763	-0.767	-0.755
TIME= 1000.00		INVOLVE MULTI-PASS EFFECT 2 PASS									
TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.369	-0.027	-0.026	-0.026	-0.026	-0.026	-0.025	-0.022	-0.016	-0.014	-0.013
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.331	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
STRESS	139.619	-0.790	-0.785	-0.780	-0.774	-0.759	-0.750	-0.750	-0.750	-0.759	-0.751
TIME= 1000.00		INVOLVE MULTI-PASS EFFECT 4 PASS									
TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.369	-0.027	-0.026	-0.026	-0.026	-0.026	-0.025	-0.022	-0.016	-0.014	-0.013
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.331	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
STRESS	139.619	-0.790	-0.785	-0.780	-0.774	-0.759	-0.750	-0.750	-0.750	-0.759	-0.751
TIME= 0.0		INVOLVE MULTI-PASS EFFECT 3 PASS									
TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.369	-0.027	-0.026	-0.026	-0.026	-0.026	-0.025	-0.022	-0.016	-0.014	-0.013
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.331	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985
STRESS	139.619	-0.790	-0.785	-0.780	-0.774	-0.759	-0.750	-0.750	-0.750	-0.759	-0.751

THIS PAGE IS BEST QUALITY PRACTICAL
FROM JULY 1958 TO 1960

TIME- 1.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 2.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 3.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 4.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 5.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 6.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME- 7.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	152.60	152.57	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.020	-0.037	-0.037	-0.037	-0.037	-0.036	-0.036	-0.036	-0.027	-0.025	-0.024
PLASTIC STRAIN	-0.775	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.755	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
STRESS	139.300	-1.110	-1.100	-1.099	-1.093	-1.078	-1.069	-0.975	-0.809	-0.749	-0.700

TIME= 0.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	109.16	152.06	152.59	152.55	152.52	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-0.150	-0.030	-0.036	-0.036	-0.036	-0.036	-0.035	-0.032	-0.026	-0.024	-0.023
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.850	-0.030	-0.036	-0.036	-0.036	-0.036	-0.035	-0.032	-0.026	-0.024	-0.023
STRESS	125.142	-1.136	-1.061	-1.073	-1.067	-1.051	-1.043	-0.998	-0.773	-0.722	-0.674

TIME= 4.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	875.62	155.76	152.68	152.56	152.54	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-2.823	-0.042	-0.041	-0.020	-0.020	-0.019	-0.019	-0.016	-0.010	-0.004	-0.007
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-3.523	-0.042	-0.041	-0.020	-0.020	-0.019	-0.019	-0.016	-0.010	-0.004	-0.007
STRESS	64.705	-1.207	-0.623	-0.599	-0.590	-0.576	-0.565	-0.571	-0.335	-0.245	-0.196

TIME= 8.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	4500.00	167.00	153.42	152.63	152.53	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-17.541	-0.032	0.007	0.072	0.373	0.076	0.076	0.077	0.073	0.065	0.066
PLASTIC STRAIN	-17.541	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.082	-0.032	0.007	0.072	0.373	0.076	0.076	0.077	0.073	0.065	0.066
STRESS	0.0	-0.941	1.990	2.151	2.171	2.169	2.198	2.292	2.450	2.519	2.567

TIME= 11.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	2500.00	197.54	155.36	152.84	152.56	152.44	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-17.571	-0.240	0.064	0.041	0.003	0.004	0.004	0.007	0.003	0.005	0.007
PLASTIC STRAIN	-17.571	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.142	-0.240	0.064	0.041	0.003	0.004	0.004	0.007	0.003	0.005	0.007
STRESS	0.0	-6.776	1.903	2.615	2.871	2.896	2.905	2.999	2.765	2.826	2.874

TIME= 12.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	2500.00	239.64	154.37	153.85	152.66	152.45	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-17.555	-0.515	0.051	0.090	0.098	0.099	0.100	0.103	0.104	0.110	0.114
PLASTIC STRAIN	-17.555	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.110	-0.515	0.051	0.090	0.098	0.099	0.100	0.103	0.104	0.110	0.114
STRESS	0.0	-15.166	1.503	2.666	2.908	2.951	2.961	3.056	3.222	3.283	3.331

TIME= 13.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	4500.00	240.76	166.58	155.48	152.88	152.45	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-17.540	-0.797	0.018	0.094	0.112	0.115	0.115	0.119	0.124	0.126	0.128
PLASTIC STRAIN	-17.540	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.080	-0.797	0.018	0.094	0.112	0.115	0.115	0.119	0.124	0.126	0.128
STRESS	0.0	-23.350	0.541	2.806	3.034	3.021	3.031	3.127	3.292	3.353	3.402

TIME= 16.00 INVOLVE MULTI-PASS EFFECT J PASS

TEMPERATURE	4500.00	313.19	176.36	150.13	153.74	152.47	152.40	151.93	151.12	150.82	150.58
MECH. STRAIN	-17.526	-1.023	-0.034	0.050	0.120	0.129	0.129	0.132	0.130	0.140	0.142
PLASTIC STRAIN	-17.526	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-35.052	-1.023	-0.034	0.050	0.120	0.129	0.129	0.132	0.130	0.140	0.142
STRESS	0.0	-29.858	-0.955	2.680	3.373	3.631	3.645	3.901	4.107	4.168	4.216

TIME= 15.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	2407.74	116.57	187.18	161.88	154.79	152.51	152.41	151.93	151.12	150.82
MECH. STRAIN	-10.749	-1.270	-0.182	-0.017	0.041	0.057	0.050	0.001	0.000	0.000
PLASTIC STRAIN	-17.548	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-28.297	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028	1.028
STRESS	1.208	-36.937	-5.406	-0.213	1.231	1.694	1.713	1.810	1.976	2.037
TIME= 16.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	2506.00	152.74	198.07	166.60	156.10	152.57	152.43	151.93	151.12	150.82
MECH. STRAIN	-17.505	-1.300	-0.172	0.053	0.123	0.149	0.150	0.153	0.159	0.162
PLASTIC STRAIN	-17.505	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.120	1.120
STRESS	0.0	-37.711	-5.090	1.568	1.073	0.430	0.060	0.500	0.720	0.836
TIME= 17.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMP DOES NOT CONVERGE J= 1 TS, TO, TM= 2402.41 2404.83 2500.00***** USED T4 *****										
TEMPERATURE	2482.41	163.62	210.35	172.07	154.29	152.45	152.45	151.93	151.12	150.82
MECH. STRAIN	-17.400	-1.400	-0.130	-0.062	0.023	0.071	0.072	0.076	0.082	0.085
PLASTIC STRAIN	-17.505	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.043	1.043	1.043	1.043	1.043	1.043	1.043	1.043	1.043	1.043
STRESS	0.005	-42.276	-9.764	-1.087	0.969	2.109	2.156	2.261	2.427	2.536
TIME= 18.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	2457.48	170.64	221.10	178.01	160.75	152.45	152.50	151.93	151.12	150.82
MECH. STRAIN	-17.209	-1.538	-0.401	-0.098	0.022	0.075	0.078	0.082	0.087	0.089
PLASTIC STRAIN	-17.505	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.049	1.049	1.049	1.049	1.049	1.049	1.049	1.049	1.049	1.049
STRESS	0.050	-43.616	-11.431	-2.897	0.639	2.245	2.318	2.432	2.598	2.707
TIME= 19.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	1596.09	375.02	236.06	184.17	162.59	153.44	152.56	151.93	151.12	150.82
MECH. STRAIN	-10.577	-1.538	-0.468	-0.138	0.005	0.074	0.080	0.085	0.090	0.094
PLASTIC STRAIN	-12.916	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051
STRESS	10.136	-44.461	-13.805	-0.082	0.141	2.208	2.387	2.515	2.681	2.792
TIME= 20.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	1526.93	377.41	239.40	190.33	164.76	151.92	152.66	151.93	151.12	150.82
MECH. STRAIN	-10.582	-1.552	-0.526	-0.177	-0.013	0.075	0.083	0.088	0.094	0.098
PLASTIC STRAIN	-12.910	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055
STRESS	11.940	-44.460	-15.406	-5.242	-0.193	2.225	2.480	2.628	2.794	2.903
TIME= 20.00	INVOLVE MULTI-PASS EFFECT J PASS									
TEMPERATURE	1352.17	362.66	246.77	214.01	200.11	164.69	157.09	151.93	151.12	150.82
MECH. STRAIN	-7.438	-1.431	-0.818	-0.481	-0.238	0.010	0.057	0.098	0.103	0.105
PLASTIC STRAIN	-11.253	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065
STRESS	79.453	-41.444	-23.966	-14.245	-7.033	0.110	1.495	2.407	3.071	3.183

TIME=	40.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	40.00	337.86	285.11	250.94	220.66	179.04	107.52	151.95	151.12	150.82	150.58					
MECH. STRAIN	-5.049	-1.239	-0.847	-0.596	-0.378	-0.205	-0.005	0.102	0.107	0.109	0.111					
PLASTIC STRAIN	-9.482	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069					
STRESS	107.076	-36.028	-28.813	-17.527	-11.158	-2.515	-0.145	3.024	3.193	3.254	3.303					
TIME=	50.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	50.00	316.77	280.20	254.36	224.83	190.29	176.95	152.04	151.12	150.82	150.58					
MECH. STRAIN	-3.718	-1.079	-0.808	-0.619	-0.441	-0.216	-0.069	0.102	0.109	0.111	0.112					
PLASTIC STRAIN	-8.377	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.070	1.070	1.070	1.070	1.070	1.070	1.070	1.070	1.070	1.070	1.070					
STRESS	118.967	-31.878	-23.684	-18.206	-12.996	-4.793	-2.041	3.049	3.236	3.297	3.345					
TIME=	60.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	60.00	299.53	272.58	252.62	232.50	197.65	184.29	152.29	151.12	150.82	150.58					
MECH. STRAIN	-2.843	-0.952	-0.753	-0.607	-0.463	-0.214	-0.121	0.100	0.103	0.110	0.112					
PLASTIC STRAIN	-7.301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069	1.069					
STRESS	125.044	-27.822	-22.089	-17.862	-13.639	-6.342	-3.578	2.975	3.212	3.273	3.322					
TIME=	70.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	70.00	265.28	264.58	248.78	232.38	201.98	189.41	153.08	151.12	150.82	150.58					
MECH. STRAIN	-2.214	-0.848	-0.696	-0.581	-0.463	-0.247	-0.158	0.093	0.106	0.108	0.110					
PLASTIC STRAIN	-6.714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.067	1.067	1.067	1.067	1.067	1.067	1.067	1.067	1.067	1.067	1.067					
STRESS	128.867	-24.843	-20.446	-17.104	-13.650	-7.297	-4.889	2.759	3.157	3.218	3.267					
TIME=	80.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	80.00	273.30	258.92	244.12	230.53	204.22	192.70	153.93	151.12	150.82	150.58					
MECH. STRAIN	-1.746	-0.763	-0.643	-0.550	-0.453	-0.265	-0.184	0.084	0.103	0.105	0.107					
PLASTIC STRAIN	-6.310	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054					
STRESS	131.346	-22.382	-18.510	-16.208	-13.369	-7.448	-5.457	2.499	3.371	3.132	3.180					
TIME=	90.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	90.00	261.06	249.78	239.24	227.85	205.03	194.83	154.98	151.12	150.82	150.58					
MECH. STRAIN	-1.393	-0.691	-0.595	-0.519	-0.437	-0.274	-0.201	0.074	0.100	0.102	0.104					
PLASTIC STRAIN	-5.971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061					
STRESS	132.796	-20.307	-17.498	-15.276	-12.883	-8.114	-5.953	2.197	2.973	3.235	3.083					
TIME=	100.00	INVOLVE MULTI-PASS EFFECT 3 PASS														
TEMPERATURE	100.00	254.20	243.28	238.42	224.79	203.91	195.56	156.32	151.12	150.82	150.58					
MECH. STRAIN	-1.112	-0.610	-0.551	-0.487	-0.418	-0.277	-0.211	0.096	0.106	0.108	0.110					
PLASTIC STRAIN	-5.728	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
TOTAL STRAIN	1.378	1.378	1.378	1.378	1.378	1.378	1.378	1.378	1.378	1.378	1.378					
STRESS	133.905	-18.534	-16.221	-14.366	-12.344	-8.192	-6.250	1.873	2.868	2.720	2.773					

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TIME= 500.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.23	161.73	162.46	162.23	162.96	162.27	161.08	158.04	153.36	151.29	150.73	
MECH. STRAIN	-0.309	-0.044	-0.080	-0.078	-0.078	-0.074	-0.071	-0.045	-0.011	0.001	0.005	
PLASTIC STRAIN	-0.718	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.964	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	100.833	-2.406	-2.433	-2.386	-2.329	-2.190	-2.115	-1.328	-0.316	0.041	0.150	
TIME= 550.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.26	161.46	161.27	161.09	160.86	160.36	160.06	157.07	152.93	151.46	150.77	
MECH. STRAIN	-0.304	-0.071	-0.072	-0.070	-0.069	-0.065	-0.063	-0.043	-0.015	-0.034	0.002	
PLASTIC STRAIN	-0.716	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.959	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	100.879	-2.171	-2.131	-2.095	-2.052	-1.947	-1.805	-1.278	-0.437	-0.116	0.001	
TIME= 600.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.13	159.69	159.58	159.40	159.24	158.84	158.60	156.24	152.78	151.37	150.61	
MECH. STRAIN	-0.300	-0.065	-0.064	-0.063	-0.062	-0.059	-0.058	-0.041	-0.018	-0.038	-0.004	
PLASTIC STRAIN	-0.716	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.955	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	100.804	-1.932	-1.901	-1.874	-1.841	-1.759	-1.712	-1.211	-0.529	-0.243	-0.110	
TIME= 650.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.07	158.29	158.17	158.06	157.93	157.62	157.43	155.53	152.61	151.37	150.85	
MECH. STRAIN	-0.064	-0.059	-0.058	-0.057	-0.056	-0.054	-0.053	-0.043	-0.020	-0.011	-0.004	
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.764	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	139.025	-1.741	-1.717	-1.695	-1.669	-1.604	-1.567	-1.183	-0.585	-0.336	-0.231	
TIME= 700.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.03	157.14	157.04	157.00	156.89	156.64	156.49	154.92	152.44	151.35	150.87	
MECH. STRAIN	-0.005	-0.054	-0.053	-0.053	-0.052	-0.050	-0.049	-0.038	-0.022	-0.014	-0.011	
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.705	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	139.746	-1.601	-1.582	-1.564	-1.549	-1.491	-1.461	-1.143	-0.641	-0.418	-0.322	
TIME= 750.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.02	156.29	156.21	156.14	156.06	155.85	155.72	154.42	152.20	151.32	150.89	
MECH. STRAIN	-0.007	-0.053	-0.050	-0.049	-0.049	-0.047	-0.046	-0.046	-0.037	-0.016	-0.013	
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.707	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	139.678	-1.493	-1.477	-1.463	-1.445	-1.402	-1.377	-1.112	-0.600	-0.485	-0.397	
TIME= 800.00 INVOLVE MULTI-PASS EFFECT 3 PASS												
TEMPERATURE	150.01	155.59	155.52	155.46	155.39	155.21	155.13	154.99	152.13	151.29	150.93	
MECH. STRAIN	-0.007	-0.047	-0.047	-0.047	-0.046	-0.045	-0.044	-0.043	-0.024	-0.018	-0.015	
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL STRAIN	-0.707	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.044	
STRESS	139.620	-1.410	-1.396	-1.384	-1.369	-1.333	-1.312	-1.086	-0.739	-0.538	-0.459	

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TIME= 450.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	155.02	154.96	154.91	154.85	154.69	154.60	153.68	152.00	151.25	150.90
MECH. STRAIN	-0.011	-0.005	-0.005	-0.004	-0.004	-0.003	-0.002	-0.006	-0.025	-0.019	-0.017
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943
STRESS	139.571	-1.304	-1.333	-1.322	-1.310	-1.279	-1.260	-1.065	-0.722	-0.500	-0.504

TIME= 400.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	154.56	154.51	154.47	154.41	154.28	154.20	153.34	151.68	151.20	150.89
MECH. STRAIN	-0.014	-0.003	-0.003	-0.002	-0.002	-0.001	-0.001	-0.035	-0.025	-0.021	-0.018
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941	0.941
STRESS	139.533	-1.290	-1.280	-1.271	-1.260	-1.232	-1.216	-1.003	-0.740	-0.628	-0.540

TIME= 350.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	154.19	154.15	154.11	154.06	153.94	153.87	153.13	151.77	151.26	150.88
MECH. STRAIN	-0.014	-0.002	-0.002	-0.001	-0.001	-0.000	-0.000	-0.035	-0.025	-0.022	-0.019
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	139.498	-1.250	-1.241	-1.233	-1.223	-1.199	-1.188	-1.029	-0.759	-0.655	-0.579

TIME= 300.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.74	153.67	153.60	152.90	151.67	151.22	150.87
MECH. STRAIN	-0.014	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	-0.034	-0.026	-0.023	-0.020
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
STRESS	139.464	-1.219	-1.211	-1.204	-1.195	-1.172	-1.159	-1.017	-0.769	-0.671	-0.605

TIME= 250.00 INVOLVE MULTI-PASS EFFECT 3 PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.74	153.67	153.60	152.90	151.67	151.22	150.87
MECH. STRAIN	-0.014	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	-0.034	-0.026	-0.023	-0.020
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
STRESS	139.469	-1.219	-1.211	-1.204	-1.195	-1.172	-1.159	-1.017	-0.769	-0.677	-0.605

TIME= 200.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.74	153.67	153.60	152.90	151.67	151.22	150.87
MECH. STRAIN	-0.024	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.035	-0.032	-0.030
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.494	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.888

TIME= 100.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.74	153.67	153.60	152.90	151.67	151.22	150.87
MECH. STRAIN	-0.024	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.035	-0.032	-0.030
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.494	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.888

TIME= 2.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 3.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 4.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 5.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 6.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 7.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 8.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	150.00	153.90	153.86	153.82	153.78	153.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-0.024	-0.050	-0.050	-0.050	-0.050	-0.049	-0.048	-0.044	-0.035	-0.032	-0.030
PLASTIC STRAIN	-4.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.130	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
STRESS	139.187	-1.502	-1.498	-1.486	-1.477	-1.455	-1.442	-1.300	-1.051	-0.960	-0.868

TIME= 9.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	409.05	157.06	153.84	153.78	151.67	153.60	152.90	151.67	151.22	150.87
RECH. STRAIN	-1.903	-0.055	-0.333	-0.332	-0.031	-0.031	-0.026	-0.013	-0.015	-0.012
PLASTIC STRAIN	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947	0.947
STRESS	80.444	-1.024	-0.596	-0.957	-0.936	-0.921	-0.779	-0.531	-0.439	-0.467

TIME= 10.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	2500.00	169.10	154.71	153.90	153.79	153.67	153.60	151.67	151.22	150.87
RECH. STRAIN	-17.575	-0.035	0.000	0.069	0.070	0.071	0.076	0.084	0.090	0.090
PLASTIC STRAIN	-17.575	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	0.000	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
STRESS	0.000	-1.041	1.056	2.060	2.083	2.108	2.122	2.268	2.513	2.677

TIME= 11.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	2500.00	194.09	156.65	154.12	153.82	153.67	153.60	151.67	151.22	150.87
RECH. STRAIN	-17.565	-0.232	0.000	0.070	0.080	0.081	0.082	0.096	0.095	0.100
PLASTIC STRAIN	-17.565	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060
STRESS	0.000	-6.077	1.009	2.124	2.104	2.015	2.029	2.571	2.820	2.984

TIME= 12.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	4500.00	241.16	160.86	155.13	153.92	153.67	153.60	151.67	151.22	150.87
RECH. STRAIN	-17.550	-0.518	0.000	0.087	0.095	0.097	0.097	0.102	0.113	0.116
PLASTIC STRAIN	-17.550	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075	1.075
STRESS	0.000	-15.267	1.008	2.575	2.821	2.872	2.885	3.628	3.277	3.441

TIME= 13.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	4406.70	242.00	167.87	156.75	154.18	153.88	153.60	151.67	151.22	150.87
RECH. STRAIN	-16.907	-0.001	-0.366	0.011	0.029	0.032	0.032	0.037	0.045	0.051
PLASTIC STRAIN	-17.550	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011
STRESS	0.277	-25.012	-1.947	0.319	0.850	0.945	0.960	1.102	1.351	1.515

TIME= 14.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	2500.00	314.41	177.37	159.41	155.00	153.69	153.60	151.67	151.22	150.87
RECH. STRAIN	-17.540	-1.027	-0.337	0.000	0.117	0.126	0.127	0.132	0.140	0.145
PLASTIC STRAIN	-17.540	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105
STRESS	0.000	-29.953	-1.092	2.588	3.465	3.752	3.773	4.162	4.254	4.326

TIME= 15.00 INVOLVE MULTI-PASS EFFECT # PASS

TEMPERATURE	2500.00	337.77	188.47	163.16	156.95	153.73	153.61	151.67	151.22	150.87
RECH. STRAIN	-17.509	-1.191	-0.103	0.073	0.121	0.137	0.138	0.143	0.154	0.157
PLASTIC STRAIN	-17.509	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL STRAIN	1.116	1.116	1.116	1.116	1.116	1.116	1.116	1.116	1.116	1.116
STRESS	0.000	-34.616	-1.093	2.163	3.013	4.005	4.109	4.253	4.502	4.647

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TIME= 50.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	576.39	310.02	281.44	255.60	230.87	191.51	170.15	153.03	151.67	151.22	150.87
MECH. STRAIN	-3.110	-1.073	-0.821	-0.622	-0.454	-0.174	-0.041	0.092	0.101	0.104	0.106
PLASTIC STRAIN	-7.546	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-10.656	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066
STRESS	123.305	-31.861	-24.067	-18.588	-13.175	-5.165	-2.409	2.731	3.302	3.034	3.167
TIME= 60.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	496.97	400.70	274.82	253.87	233.82	198.86	185.44	153.25	151.67	151.22	150.87
MECH. STRAIN	-2.079	-0.965	-0.766	-0.620	-0.475	-0.227	-0.113	0.090	0.100	0.103	0.104
PLASTIC STRAIN	-6.276	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065	1.065
STRESS	127.276	-28.203	-22.867	-18.239	-13.013	-6.709	-3.940	2.663	2.984	3.076	3.168
TIME= 70.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	437.62	286.55	265.44	250.82	233.61	203.20	190.60	154.05	151.67	151.22	150.87
MECH. STRAIN	-2.010	-0.861	-0.709	-0.594	-0.476	-0.259	-0.170	0.082	0.096	0.102	0.104
PLASTIC STRAIN	-6.551	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.064	1.064	1.064	1.064	1.064	1.064	1.064	1.064	1.064	1.064	1.064
STRESS	129.948	-25.223	-20.825	-17.480	-14.023	-7.663	-5.650	2.448	2.930	3.022	3.695
TIME= 80.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	392.33	274.57	250.17	245.37	231.77	205.43	193.43	154.90	151.67	151.22	150.87
MECH. STRAIN	-1.661	-0.776	-0.656	-0.563	-0.465	-0.278	-0.196	0.074	0.096	0.099	0.101
PLASTIC STRAIN	-6.249	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061
STRESS	131.729	-22.762	-19.287	-16.583	-13.720	-8.212	-5.817	2.189	2.685	2.936	3.009
TIME= 90.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	353.79	264.33	251.04	240.49	229.39	206.75	195.82	155.31	151.64	151.22	150.87
MECH. STRAIN	-1.371	-0.704	-0.604	-0.531	-0.449	-0.287	-0.213	0.063	0.092	0.095	0.098
PLASTIC STRAIN	-5.952	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.057	1.057	1.057	1.057	1.057	1.057	1.057	1.057	1.057	1.057	1.057
STRESS	124.090	-20.688	-17.877	-15.652	-13.255	-8.079	-6.313	1.887	2.787	2.839	2.911
TIME= 100.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	323.20	255.47	244.50	235.60	226.03	206.12	196.75	156.99	151.64	151.22	150.87
MECH. STRAIN	-1.144	-0.643	-0.564	-0.500	-0.431	-0.289	-0.223	0.053	0.089	0.092	0.094
PLASTIC STRAIN	-5.730	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054
STRESS	133.845	-18.916	-16.600	-14.743	-12.717	-8.558	-6.411	1.562	2.681	2.734	2.866
TIME= 150.00	INVOLVE MULTI-PASS EFFECT & PASS										
TEMPERATURE	231.42	224.24	219.20	214.99	210.17	199.51	194.02	161.69	151.19	151.22	150.87
MECH. STRAIN	-0.488	-0.437	-0.401	-0.370	-0.336	-0.261	-0.222	0.032	0.073	0.073	0.076
PLASTIC STRAIN	-5.130	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014
STRESS	136.951	-12.884	-11.028	-10.946	-9.948	-7.727	-5.588	0.659	2.372	2.417	2.460

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TIME- 550.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.53	162.77	162.55	162.37	162.14	161.59	161.27	158.34	153.49	151.76	151.06
MECH. STRAIN	-0.002	-0.006	-0.004	-0.003	-0.002	-0.076	-0.076	-0.054	-0.022	-0.011	-0.006
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.005	-0.005	-0.005	-0.005	-0.005	-0.076	-0.076	-0.054	-0.022	-0.011	-0.006
STRESS	139.737	-2.558	-2.511	-2.473	-2.427	-2.314	-2.269	-1.593	-0.669	-0.116	-0.176

TIME- 600.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.29	160.49	160.42	160.64	160.50	160.06	159.81	157.21	153.14	151.78	151.10
MECH. STRAIN	-0.005	-0.076	-0.077	-0.076	-0.075	-0.072	-0.070	-0.052	-0.026	-0.015	-0.010
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.005	-0.076	-0.077	-0.076	-0.075	-0.072	-0.070	-0.052	-0.026	-0.015	-0.010
STRESS	139.665	-2.316	-2.282	-2.252	-2.216	-2.127	-2.075	-1.547	-0.761	-0.445	-0.308

TIME- 650.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.25	159.54	159.46	159.34	159.20	158.84	158.63	156.49	153.17	151.77	151.14
MECH. STRAIN	-0.009	-0.072	-0.071	-0.070	-0.069	-0.067	-0.065	-0.051	-0.024	-0.014	-0.014
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.007	-0.072	-0.071	-0.070	-0.069	-0.067	-0.065	-0.051	-0.024	-0.014	-0.014
STRESS	139.567	-2.116	-2.107	-2.083	-2.056	-1.981	-1.914	-1.505	-0.833	-0.547	-0.418

TIME- 700.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.21	150.48	150.37	150.27	150.15	157.86	157.69	155.89	153.00	151.76	151.16
MECH. STRAIN	-0.011	-0.067	-0.064	-0.060	-0.055	-0.063	-0.062	-0.049	-0.020	-0.021	-0.017
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.005	-0.067	-0.064	-0.060	-0.055	-0.063	-0.062	-0.049	-0.020	-0.021	-0.017
STRESS	139.451	-1.994	-1.972	-1.952	-1.926	-1.868	-1.833	-1.868	-0.882	-0.629	-0.409

TIME- 750.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.13	157.59	157.50	157.32	157.22	157.07	156.92	155.34	152.44	151.73	151.18
MECH. STRAIN	-0.012	-0.063	-0.063	-0.062	-0.062	-0.060	-0.059	-0.048	-0.031	-0.023	-0.020
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.007	-0.063	-0.063	-0.062	-0.062	-0.060	-0.059	-0.048	-0.031	-0.023	-0.020
STRESS	139.440	-1.866	-1.867	-1.850	-1.830	-1.780	-1.750	-1.637	-0.922	-0.696	-0.586

TIME- 800.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.04	156.89	156.81	156.73	156.65	156.43	156.31	154.96	152.69	151.69	151.18
MECH. STRAIN	-0.014	-0.061	-0.060	-0.060	-0.059	-0.057	-0.057	-0.047	-0.032	-0.025	-0.022
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.007	-0.061	-0.060	-0.060	-0.059	-0.057	-0.057	-0.047	-0.032	-0.025	-0.022
STRESS	139.391	-1.802	-1.786	-1.771	-1.754	-1.710	-1.684	-1.611	-0.951	-0.749	-0.666

TIME- 850.00 INVOLVE MULTI-PASS EFFECT 4 PASS

TEMPERATURE	150.05	156.72	156.25	156.18	156.11	155.92	155.80	154.61	152.36	151.66	151.18
MECH. STRAIN	-0.016	-0.058	-0.056	-0.057	-0.057	-0.056	-0.055	-0.047	-0.033	-0.027	-0.024
PLASTIC STRAIN	-0.007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.007	-0.058	-0.056	-0.057	-0.057	-0.056	-0.055	-0.047	-0.033	-0.027	-0.024
STRESS	139.347	-1.737	-1.723	-1.710	-1.695	-1.656	-1.633	-1.589	-0.974	-0.791	-0.696

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TINL= 1000.00	INVOLVE MULTI-PASS EFFECT 4 PASS										
TEMPERATURE	150.01	155.20	155.14	155.09	155.04	154.89	154.80	153.87	152.23	151.63	151.15
MACH. STRAIN	-0.014	-0.054	-0.050	-0.053	-0.053	-0.052	-0.051	-0.048	-0.034	-0.030	-0.027
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.15	0.915	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
STRESS	134.454	-0.614	-1.001	-1.591	-1.579	-1.509	-1.402	-1.102	-1.011	-0.808	-0.792

	INVOLVE MULTI-PASS EFFECT & PASS										
TIME= 1000.00	150.61	155.26	155.09	155.04	155.38	156.49	156.00	151.87	152.23	151.63	151.15
TEMPERATURE	-0.014	-0.054	-0.054	-0.053	-0.053	-0.052	-0.051	-0.045	-0.034	-0.030	-0.027
MELCH. STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PLASTIC STRAIN	0.735	0.915	0.915	0.915	0.915	0.945	0.935	0.935	0.935	0.935	0.935
TOTAL STRAIN	0.038	0.861	0.861	0.861	0.861	0.895	0.885	0.885	0.885	0.885	0.885
STRESS	186.725	1.432	1.603	1.549	1.538	1.449	1.431	1.382	1.311	0.918	-0.789

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TIME= 1.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.01	155.20	155.16	155.09	155.24	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.029	-0.066	-0.066	-0.066	-0.063	-0.062	-0.062	-0.055	-0.044	-0.040	-0.037
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.946	-1.918	-1.907	-1.897	-1.885	-1.855	-1.837	-1.808	-1.717	-1.715	-1.650

TIME= 4.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.01	155.20	155.16	155.09	155.24	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.029	-0.066	-0.066	-0.066	-0.063	-0.062	-0.062	-0.055	-0.044	-0.040	-0.037
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.946	-1.918	-1.907	-1.897	-1.885	-1.855	-1.837	-1.808	-1.717	-1.715	-1.650

TIME= 5.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.01	155.20	155.16	155.09	155.24	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.029	-0.066	-0.066	-0.066	-0.063	-0.062	-0.062	-0.055	-0.044	-0.040	-0.037
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.946	-1.918	-1.907	-1.897	-1.885	-1.855	-1.837	-1.808	-1.717	-1.715	-1.650

TIME= 6.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.01	155.20	155.16	155.09	155.24	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.029	-0.066	-0.066	-0.066	-0.063	-0.062	-0.062	-0.055	-0.044	-0.040	-0.037
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.946	-1.918	-1.907	-1.897	-1.885	-1.855	-1.837	-1.808	-1.717	-1.715	-1.650

TIME= 7.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.01	155.20	155.16	155.09	155.24	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.029	-0.066	-0.066	-0.066	-0.063	-0.062	-0.062	-0.055	-0.044	-0.040	-0.037
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.946	-1.918	-1.907	-1.897	-1.885	-1.855	-1.837	-1.808	-1.717	-1.715	-1.650

TIME= 8.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	161.62	155.46	155.16	155.10	155.04	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-0.108	-0.065	-0.063	-0.063	-0.063	-0.062	-0.061	-0.055	-0.043	-0.039	-0.036
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	130.941	-1.940	-1.888	-1.875	-1.862	-1.832	-1.818	-1.625	-1.294	-1.172	-1.075

TIME= 9.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	162.96	158.37	155.26	155.11	155.04	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-1.529	-0.060	-0.047	-0.046	-0.045	-0.044	-0.044	-0.037	-0.026	-0.022	-0.017
PLASTIC STRAIN	-0.697	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943	0.943
STRESS	91.028	-2.027	-1.396	-1.366	-1.351	-1.321	-1.303	-1.114	-0.782	-0.660	-0.564

TIME- 10.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	2500.00	170.41	156.00	155.18	155.05	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-17.570	-0.034	0.061	0.066	0.067	0.064	0.069	0.075	0.086	0.090	0.090
PLASTIC STRAIN	-17.570	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055
STRESS	0.0	-1.140	1.002	1.969	1.995	2.028	2.046	2.235	2.567	2.690	2.786

TIME- 11.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	2500.00	200.19	157.94	155.34	155.04	154.89	154.83	153.87	152.23	151.63	151.15
MECH. STRAIN	-17.559	-0.236	0.058	0.075	0.077	0.079	0.079	0.085	0.097	0.101	0.104
PLASTIC STRAIN	-17.559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066	1.066
STRESS	0.0	-6.979	1.715	2.233	2.296	2.335	2.353	2.563	2.675	2.937	3.094

TIME- 12.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	2302.02	202.03	162.15	156.41	155.10	154.89	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-16.217	-0.601	-0.035	0.004	0.012	0.014	0.015	0.021	0.031	0.037	0.040
PLASTIC STRAIN	-17.559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.302	1.002	1.062	1.062	1.062	1.062	1.062	1.062	1.062	1.062	1.062
STRESS	0.020	-17.707	-1.067	0.122	0.372	0.440	0.440	0.638	0.973	1.092	1.168

TIME- 13.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	2500.00	202.20	164.16	154.03	155.40	154.90	154.80	153.87	152.23	151.63	151.15
MECH. STRAIN	-17.540	-0.800	0.012	0.004	0.006	0.010	0.010	0.017	0.024	0.030	0.035
PLASTIC STRAIN	-17.540	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.097	1.097	1.097	1.097	1.097	1.097	1.097	1.097	1.097	1.097	1.097
STRESS	0.0	-23.550	0.309	2.623	3.159	3.261	3.280	3.471	3.803	3.925	4.022

TIME- 14.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	1529.20	215.02	170.86	160.69	156.26	154.92	154.81	153.87	152.23	151.63	151.15
MECH. STRAIN	-10.608	-1.110	-0.127	-0.003	0.027	0.036	0.037	0.043	0.054	0.058	0.062
PLASTIC STRAIN	-13.180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.023	1.023	1.023	1.023	1.023	1.023	1.023	1.023	1.023	1.023	1.023
STRESS	13.203	-32.590	-3.783	-0.103	0.790	1.072	1.094	1.285	1.617	1.739	1.836

TIME- 15.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	1923.00	338.97	169.76	164.44	157.31	154.95	154.81	153.87	152.23	151.63	151.15
MECH. STRAIN	-10.101	-1.205	-0.197	-0.022	0.027	0.043	0.044	0.051	0.062	0.066	0.069
PLASTIC STRAIN	-13.180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031
STRESS	20.769	-37.366	-5.851	-0.647	0.806	1.285	1.313	1.505	1.837	1.959	2.056

TIME- 16.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	1336.21	355.14	201.44	169.16	154.02	155.02	154.83	153.87	152.23	151.63	151.15
MECH. STRAIN	-9.403	-1.403	-0.275	-0.050	0.021	0.047	0.049	0.055	0.066	0.070	0.074
PLASTIC STRAIN	-13.151	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.035	1.035	1.035	1.035	1.035	1.035	1.035	1.035	1.035	1.035	1.035
STRESS	31.200	-40.602	-8.134	-1.475	0.637	1.470	1.447	1.644	1.976	2.098	2.195

TIME= 17.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	1256.76	166.00	214.91	170.63	160.82	155.13	154.85	153.87	152.23	151.63
MECH. STRAIN	-9.375	-1.942	-0.353	-0.048	0.011	0.050	0.052	0.059	0.070	0.074
PLASTIC STRAIN	-12.425	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.039	1.039	1.039	1.039	1.039	1.039	1.039	1.039	1.039	1.039
STRESS	41.393	-42.507	-10.326	-2.099	0.326	1.485	1.560	1.741	2.073	2.195
TIME= 18.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	1184.50	373.04	224.65	180.57	161.27	155.30	154.90	152.87	152.23	151.63
MECH. STRAIN	-8.746	-1.534	-0.428	-0.124	-0.004	0.050	0.053	0.060	0.071	0.074
PLASTIC STRAIN	-12.356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.030	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040
STRESS	53.869	-44.374	-12.629	-3.680	-0.134	1.491	1.574	1.782	2.114	2.236
TIME= 19.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	1114.25	377.40	233.40	186.72	166.12	155.44	154.97	153.87	152.23	151.63
MECH. STRAIN	-8.350	-1.567	-0.498	-0.167	-0.024	0.046	0.052	0.060	0.071	0.074
PLASTIC STRAIN	-11.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040
STRESS	64.401	-45.304	-14.678	-4.952	-0.713	1.367	1.555	1.778	2.110	2.232
TIME= 20.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	1059.05	379.74	241.91	192.46	163.26	156.17	155.07	153.87	152.23	151.63
MECH. STRAIN	-8.249	-1.585	-0.558	-0.209	-0.045	0.043	0.052	0.061	0.072	0.074
PLASTIC STRAIN	-11.335	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.041	1.041	1.041	1.041	1.041	1.041	1.041	1.041	1.041	1.041
STRESS	78.241	-45.791	-16.447	-6.202	-1.364	1.293	1.557	1.801	2.133	2.255
TIME= 20.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	744.92	365.11	203.24	237.31	202.62	167.14	160.30	153.87	152.23	151.63
MECH. STRAIN	-8.566	-1.461	-0.348	-0.518	-0.268	-0.314	0.024	0.072	0.083	0.091
PLASTIC STRAIN	-8.823	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.052	1.052	1.052	1.052	1.052	1.052	1.052	1.052	1.052	1.052
STRESS	112.163	-42.319	-24.850	-15.142	-7.916	-0.556	0.840	2.150	2.482	2.701
TIME= 40.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	603.94	346.33	287.79	253.43	223.15	181.49	169.90	153.87	152.23	151.63
MECH. STRAIN	-3.354	-1.267	-0.475	-0.624	-0.405	-0.112	-0.031	0.079	0.094	0.097
PLASTIC STRAIN	-7.755	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.059	1.059	1.059	1.059	1.059	1.059	1.059	1.059	1.059	1.059
STRESS	121.777	-46.837	-25.629	-18.341	-11.469	-3.311	-0.331	2.339	2.674	2.893
TIME= 50.00	INVOLVE MULTI-PASS EFFECT 5 PASS									
TEMPERATURE	516.75	319.24	242.49	256.45	232.11	192.73	174.15	151.97	152.23	151.63
MECH. STRAIN	-4.643	-1.108	-0.436	-0.647	-0.444	-0.184	-0.045	0.083	0.091	0.097
PLASTIC STRAIN	-7.123	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060
STRESS	126.326	-42.293	-24.495	-19.315	-13.400	-5.583	-2.422	2.373	2.723	2.942

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TIME	NO. JO	ABOVE	MULTI-PASS	EFFECT	5 PASS						
TEMPERATURE	371.67	275.43	259.43	246.62	233.01	206.45	195.69	155.87	152.23	151.63	151.15
MECH. STRAIN	-1.500	-0.791	-0.671	-0.570	-0.479	-0.291	-0.210	-0.062	-0.062	-0.051	-0.044
PLASTIC STRAIN	-6.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-0.55	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055
STRESS	132.466	23.166	19.739	-17.002	16.137	-0.622	-6.222	1.015	2.574	2.626	2.793

TIME	50-30	INVOLVE	MULTI-PASS	EFFECT	5 PASS						
TEMPERATURE	101.62	265.61	252.10	241.76	230.11	207.46	197.02	156.08	152.24	151.61	151.15
MECH. STRAIN	-1.284	-0.719	-0.622	-0.546	-0.468	-0.301	-0.227	-0.052	-0.693	-0.087	-0.051
PLASTIC STRAIN	-5.070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	-1.052	-1.052	-1.352	-1.352	-1.352	-1.052	-1.052	-1.052	-1.052	-1.052	-1.052
STRESS	133.266	-21.112	-10.240	-16.070	-13.671	-0.000	-6.710	-1.533	-2.376	-2.539	-2.696

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TIME= 450.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	178.53	193.72	192.03	190.57	188.45	186.82	182.54	165.23	153.38	151.64	151.16
MECH. STRAIN	-0.151	-0.257	-0.285	-0.235	-0.223	-0.195	-0.179	-0.239	-0.222	-0.234	-0.237
PLASTIC STRAIN	-0.428	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.277	0.257	0.285	0.235	0.223	0.195	0.179	0.239	0.222	0.234	0.237
STRESS	138.776	-7.614	-7.263	-6.960	-6.605	-5.778	-5.315	-1.754	0.666	1.003	1.109

TIME= 400.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	168.85	184.60	183.51	182.56	181.45	178.77	177.26	164.57	153.79	151.75	151.16
MECH. STRAIN	-0.343	-0.206	-0.194	-0.191	-0.184	-0.165	-0.155	-0.267	-0.207	-0.221	-0.225
PLASTIC STRAIN	-0.749	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.406	0.206	0.194	0.191	0.184	0.165	0.155	0.267	0.207	0.221	0.225
STRESS	134.203	-6.097	-5.873	-5.676	-5.487	-4.806	-4.586	-1.307	0.207	3.619	0.738

TIME= 350.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	160.11	177.94	177.24	176.50	175.81	173.95	172.90	163.47	154.38	151.85	151.16
MECH. STRAIN	-0.047	-0.170	-0.165	-0.161	-0.155	-0.142	-0.135	-0.070	-0.006	-0.010	-0.014
PLASTIC STRAIN	-0.737	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.690	0.170	0.165	0.161	0.155	0.142	0.135	0.070	0.006	0.010	0.014
STRESS	139.452	-5.051	-4.899	-4.764	-4.605	-4.220	-4.008	-2.002	-0.170	3.283	0.417

TIME= 300.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	156.13	172.02	172.49	172.03	171.48	170.14	169.37	162.26	154.22	151.94	151.22
MECH. STRAIN	-0.028	-0.164	-0.161	-0.137	-0.134	-0.124	-0.119	-0.070	-0.015	0.000	0.005
PLASTIC STRAIN	-0.721	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.693	0.164	0.161	0.137	0.134	0.124	0.119	0.070	0.015	0.000	0.005
STRESS	139.559	-4.203	-4.176	-4.082	-3.968	-3.694	-3.538	-2.085	-0.451	0.311	0.159

TIME= 250.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	152.75	169.24	168.86	168.52	168.11	167.12	166.55	161.07	154.24	152.04	151.24
MECH. STRAIN	-0.019	-0.125	-0.123	-0.120	-0.117	-0.111	-0.107	-0.069	-0.022	-0.007	-0.002
PLASTIC STRAIN	-0.714	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.695	0.125	0.123	0.120	0.117	0.111	0.107	0.069	0.022	0.007	0.002
STRESS	139.088	-3.718	-3.640	-3.570	-3.488	-3.285	-3.168	-2.050	-0.663	-0.215	-0.057

TIME= 200.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	152.31	166.33	166.04	165.79	165.48	164.72	164.28	159.98	154.17	152.11	151.30
MECH. STRAIN	-0.015	-0.111	-0.109	-0.107	-0.105	-0.100	-0.097	-0.067	-0.024	-0.014	-0.008
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.696	0.111	0.109	0.107	0.105	0.100	0.097	0.067	0.024	0.014	0.008
STRESS	139.741	-3.301	-3.242	-3.190	-3.127	-2.972	-2.883	-2.006	-0.827	-0.408	-0.244

TIME= 150.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	151.43	164.07	163.48	162.64	161.40	162.01	162.47	159.31	154.05	152.17	151.35
MECH. STRAIN	-0.014	-0.100	-0.099	-0.098	-0.096	-0.092	-0.089	-0.066	-0.032	-0.019	-0.013
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.697	0.100	0.099	0.098	0.096	0.092	0.089	0.066	0.032	0.019	0.013
STRESS	139.774	-2.946	-2.941	-2.903	-2.851	-2.730	-2.660	-1.956	-0.745	-0.508	-0.401

TIME= 600.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.49	162.24	162.11	161.95	161.76	161.29	161.01	158.18	153.94	152.19	151.39
MECH. STRAIN	-0.015	-0.092	-0.091	-0.090	-0.089	-0.086	-0.084	-0.064	-0.035	-0.023	-0.018
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945
STRESS	139.767	-2.768	-2.712	-2.679	-2.643	-2.543	-2.487	-1.510	-1.061	-0.696	-0.533

TIME= 650.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.54	160.89	160.74	160.61	160.46	160.36	159.88	157.46	153.73	152.14	151.42
MECH. STRAIN	-0.016	-0.066	-0.085	-0.084	-0.083	-0.081	-0.079	-0.063	-0.037	-0.027	-0.022
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
STRESS	139.736	-2.566	-2.535	-2.509	-2.477	-2.397	-2.351	-1.868	-1.110	-0.796	-0.643

TIME= 700.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.36	159.78	159.66	159.55	159.42	159.34	158.87	156.86	153.56	152.16	151.45
MECH. STRAIN	-0.017	-0.081	-0.080	-0.079	-0.078	-0.076	-0.075	-0.061	-0.039	-0.029	-0.024
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
STRESS	139.710	-2.410	-2.385	-2.363	-2.346	-2.269	-2.229	-1.817	-1.167	-0.868	-0.719

TIME= 750.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.65	159.96	159.74	159.64	159.54	159.49	158.11	156.35	153.10	152.14	151.46
MECH. STRAIN	-0.020	-0.077	-0.077	-0.076	-0.075	-0.073	-0.072	-0.060	-0.040	-0.031	-0.027
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
STRESS	139.618	-2.302	-2.281	-2.261	-2.238	-2.180	-2.146	-1.785	-1.186	-0.930	-0.794

TIME= 800.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.30	159.19	159.10	159.01	157.91	157.66	157.51	155.91	153.25	152.10	151.47
MECH. STRAIN	-0.021	-0.075	-0.074	-0.073	-0.071	-0.071	-0.070	-0.059	-0.041	-0.033	-0.029
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945
STRESS	139.590	-2.218	-2.200	-2.182	-2.142	-2.110	-2.080	-1.759	-1.216	-0.983	-0.856

TIME= 850.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.20	157.62	157.54	157.46	157.37	157.14	157.01	155.57	153.12	152.06	151.47
MECH. STRAIN	-0.024	-0.072	-0.072	-0.071	-0.071	-0.069	-0.068	-0.058	-0.042	-0.034	-0.030
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933	0.933
STRESS	139.561	-2.153	-2.136	-2.121	-2.102	-2.050	-2.029	-1.738	-1.239	-1.026	-0.906

TIME= 900.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.14	157.14	157.09	157.02	156.93	156.74	156.63	155.28	152.79	152.11	151.47
MECH. STRAIN	-0.024	-0.071	-0.070	-0.070	-0.069	-0.064	-0.067	-0.058	-0.042	-0.036	-0.032
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932	0.932
STRESS	139.536	-2.099	-2.083	-2.069	-2.052	-2.010	-1.985	-1.717	-1.253	-1.049	-0.943

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TIME= 950.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	156.10	156.50	156.73	156.66	156.58	156.39	156.27	155.04	152.49	152.07	151.46
MECH. STRAIN	-0.024	-0.069	-0.069	-0.068	-0.068	-0.066	-0.066	-0.057	-0.043	-0.037	-0.033
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.511	-2.059	-2.305	-2.303	-2.316	-1.976	-1.953	-1.702	-1.266	-1.101	-0.976

TIME= 1000.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.068	-0.068	-0.067	-0.067	-0.066	-0.065	-0.057	-0.043	-0.038	-0.034
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.406	-2.026	-2.014	-2.002	-1.987	-1.969	-1.927	-1.600	-1.276	-1.123	-1.002

TIME= 1000.00 INVOLVE MULTI-PASS EFFECT 5 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.068	-0.068	-0.067	-0.067	-0.066	-0.065	-0.057	-0.043	-0.038	-0.034
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.406	-2.026	-2.014	-2.002	-1.987	-1.969	-1.927	-1.600	-1.276	-1.123	-1.002

TIME= 0.3 INVOLVE MULTI-PASS EFFECT 6 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.070	-0.077	-0.077	-0.077	-0.075	-0.075	-0.067	-0.053	-0.048	-0.043
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.107	-2.319	-2.305	-2.293	-2.277	-2.263	-2.218	-1.901	-1.567	-1.414	-1.293

TIME= 1.00 INVOLVE MULTI-PASS EFFECT 6 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.070	-0.077	-0.077	-0.077	-0.075	-0.075	-0.067	-0.053	-0.048	-0.043
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.107	-2.319	-2.305	-2.293	-2.277	-2.263	-2.218	-1.901	-1.567	-1.414	-1.293

TIME= 2.00 INVOLVE MULTI-PASS EFFECT 6 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.070	-0.077	-0.077	-0.077	-0.075	-0.075	-0.067	-0.053	-0.048	-0.043
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.107	-2.319	-2.305	-2.293	-2.277	-2.263	-2.218	-1.901	-1.567	-1.414	-1.293

TIME= 3.00 INVOLVE MULTI-PASS EFFECT 6 PASS

TEMPERATURE	150.07	156.50	156.43	156.37	156.30	156.11	156.00	150.84	152.79	152.04	151.44
MECH. STRAIN	-0.024	-0.070	-0.077	-0.077	-0.077	-0.075	-0.075	-0.067	-0.053	-0.048	-0.043
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.107	-2.319	-2.305	-2.293	-2.277	-2.263	-2.218	-1.901	-1.567	-1.414	-1.293

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TIME- 0.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.07	150.50	150.43	150.37	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-0.04	-0.074	-0.077	-0.077	-0.077	-0.075	-0.075	-0.075	-0.075	-0.075
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.197	-2.319	-2.305	-2.293	-2.277	-2.260	-2.240	-2.210	-1.981	-1.253
TIME- 5.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.07	150.50	150.43	150.37	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-0.04	-0.074	-0.077	-0.077	-0.077	-0.075	-0.075	-0.075	-0.075	-0.075
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.197	-2.319	-2.305	-2.293	-2.277	-2.260	-2.240	-2.210	-1.981	-1.253
TIME- 6.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.09	150.50	150.43	150.37	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-0.04	-0.074	-0.077	-0.077	-0.077	-0.075	-0.075	-0.075	-0.075	-0.075
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.193	-2.319	-2.305	-2.292	-2.277	-2.260	-2.240	-2.210	-1.981	-1.253
TIME- 7.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.09	150.50	150.43	150.37	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-0.04	-0.074	-0.077	-0.077	-0.077	-0.075	-0.075	-0.075	-0.075	-0.075
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	139.126	-2.323	-2.305	-2.292	-2.277	-2.260	-2.240	-2.210	-1.981	-1.253
TIME- 8.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.77	150.76	150.45	150.37	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-0.100	-0.079	-0.077	-0.077	-0.076	-0.075	-0.074	-0.074	-0.074	-0.074
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921
STRESS	137.693	-2.357	-2.344	-2.278	-2.263	-2.225	-2.203	-2.203	-1.552	-1.274
TIME- 9.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	131.62	150.67	150.35	150.39	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-1.321	-0.042	-0.040	-0.059	-0.059	-0.057	-0.057	-0.057	-0.057	-0.057
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
STRESS	90.596	-2.029	-1.794	-1.762	-1.744	-1.706	-1.684	-1.647	-1.032	-0.759
TIME- 10.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.00	171.72	157.29	156.45	150.30	150.11	150.00	150.00	152.79	151.44
MECH. STRAIN	-17.564	-0.042	0.057	0.063	0.064	0.065	0.066	0.074	0.084	0.097
PLASTIC STRAIN	-0.711	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061	1.061
STRESS	0.0	-1.240	1.700	1.878	1.907	1.967	1.970	2.237	2.622	2.896

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TIME=	11.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	2500.00	201.00	156.23	156.67	156.40
MECH. STRAIN	-17.554	-0.239	0.054	0.074	0.076
PLASTIC STRAIN	-17.554	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.071	1.071	1.071	1.071	1.071
STRESS	0.0	-7.002	1.640	2.162	2.208
TIME=	12.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	2500.00	203.70	163.44	157.00	156.40
MECH. STRAIN	-17.534	-0.525	0.001	0.000	0.009
PLASTIC STRAIN	-17.534	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.007	1.007	1.007	1.007	1.007
STRESS	0.0	-15.070	1.210	2.392	2.605
TIME=	13.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	1090.15	240.00	170.45	159.31	156.60
MECH. STRAIN	-10.574	-0.095	-0.080	-0.003	0.015
PLASTIC STRAIN	-1.266	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.016	1.016	1.016	1.016	1.016
STRESS	15.560	-26.227	-2.362	-0.007	0.452
TIME=	14.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	1363.12	316.00	179.95	161.97	157.53
MECH. STRAIN	-13.076	-1.129	-0.130	-0.014	0.016
PLASTIC STRAIN	-13.202	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.021	1.021	1.021	1.021	1.021
STRESS	27.064	-32.911	-0.103	-0.010	0.407
TIME=	15.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	1355.00	300.10	191.05	165.72	150.57
MECH. STRAIN	-9.401	-1.209	-0.211	-0.035	0.010
PLASTIC STRAIN	-12.010	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.026	1.026	1.026	1.026	1.026
STRESS	41.521	-37.766	-0.263	-1.055	0.403
TIME=	16.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	1157.74	350.44	204.72	170.40	160.00
MECH. STRAIN	-6.514	-1.021	-0.293	-0.067	0.009
PLASTIC STRAIN	-12.171	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.027	1.027	1.027	1.027	1.027
STRESS	59.191	-41.190	-0.650	-1.995	0.121
TIME=	17.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS
TEMPERATURE	1374.29	307.19	210.14	175.91	162.00
MECH. STRAIN	-7.604	-1.203	-0.370	-0.105	-0.010
PLASTIC STRAIN	-11.477	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.021	1.021	1.021	1.021	1.021
STRESS	74.525	-42.507	-11.003	-3.115	-0.205

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TIME-	10.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	1009.03	370.25	424.92	101.05	140.50	156.52	156.10	154.04	152.79	152.34	151.44
MCM. STRAIN	-7.059	-1.556	-0.809	-0.165	-0.025	0.030	0.033	0.041	0.055	0.060	0.064
PLASTIC STRAIN	-10.925	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024	1.024
STRESS	86.592	-40.943	-13.250	-4.333	-3.753	0.001	0.967	1.220	1.639	1.712	1.912
TIME-	15.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	953.03	370.00	430.66	100.00	167.19	157.12	156.17	154.04	152.79	152.04	151.44
MCM. STRAIN	-6.525	-1.507	-0.510	-0.107	-0.004	0.027	0.033	0.042	0.056	0.061	0.065
PLASTIC STRAIN	-10.945	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.029	1.029	1.029	1.029	1.029	1.029	1.029	1.029	1.029	1.029	1.029
STRESS	92.950	-45.070	-15.262	-5.536	-1.299	0.796	0.909	1.260	1.675	1.948	1.989
TIME-	20.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	907.00	306.99	404.17	194.15	170.55	157.59	156.27	150.40	152.79	152.04	151.44
MCM. STRAIN	-4.001	-1.603	-0.577	-0.220	0.0	0.026	0.035	0.045	0.054	0.060	0.064
PLASTIC STRAIN	-10.110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031	1.031
STRESS	97.050	-46.310	-16.909	-6.704	-1.062	0.764	1.034	1.325	1.743	1.893	2.014
TIME-	30.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	659.50	360.33	400.40	230.56	204.07	160.36	161.51	150.40	152.79	152.04	151.44
MCM. STRAIN	-3.030	-1.077	-0.064	-0.529	-0.203	-0.033	0.016	0.059	0.073	0.070	0.083
PLASTIC STRAIN	-8.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.046	1.046	1.046	1.046	1.046	1.046	1.046	1.046	1.046	1.046	1.046
STRESS	110.249	-42.700	-25.397	-15.500	-0.302	-0.992	0.099	1.767	2.103	2.336	2.457
TIME-	40.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	505.07	341.50	209.03	230.67	220.39	102.71	171.11	154.05	152.79	152.04	151.44
MCM. STRAIN	-2.079	-1.202	-0.090	-0.510	-0.420	-0.126	-0.005	0.066	0.060	0.086	0.090
PLASTIC STRAIN	-7.315	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.053	1.053	1.053	1.053	1.053	1.053	1.053	1.053	1.053	1.053	1.053
STRESS	120.920	-37.204	-26.056	-10.769	-12.365	-3.729	-1.344	1.975	2.393	2.546	2.667
TIME-	50.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	073.51	320.51	403.93	250.09	232.35	193.95	100.55	154.94	152.79	152.04	151.44
MCM. STRAIN	-2.002	-1.122	-0.050	-0.061	-0.002	-0.202	-0.100	0.060	0.003	0.000	0.042
PLASTIC STRAIN	-6.957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.056	1.056	1.056	1.056	1.056	1.056	1.056	1.056	1.056	1.056	1.056
STRESS	120.400	-32.690	-20.090	-19.416	-10.199	-5.975	-3.209	2.033	2.469	2.622	2.743
TIME-	60.00	INVOLVE	MULTI-PASS	EFFECT	6 PASS						
TEMPERATURE	022.77	303.30	276.32	250.36	230.29	201.33	107.09	155.19	152.79	152.04	151.44
MCM. STRAIN	-1.902	-2.990	-0.790	-0.040	-0.503	-0.254	-0.140	0.060	0.003	0.000	0.092
PLASTIC STRAIN	-6.957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055	1.055
STRESS	100.000	-20.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000	-10.000

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TIME=	70.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	300.24	209.07	260.34	252.52	236.04	205.63	193.60	155.98	152.79	152.04	151.44
MICH. STRAIN	-1.036	-0.090	0.737	-0.622	-0.503	-0.206	-0.197	0.059	0.001	0.006	0.050
PLASTIC STRAIN	-6.177	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.024	1.050	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054	1.054
STRESS	131.464	-26.050	-21.648	-10.298	-10.836	-0.461	-5.039	1.760	2.404	2.502	2.603
TIME=	90.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	353.60	277.10	260.69	247.07	230.25	207.06	196.29	156.04	152.79	152.04	151.44
MICH. STRAIN	-1.376	-0.064	-0.604	-0.591	-0.493	-0.305	-0.223	0.051	0.374	0.003	0.007
PLASTIC STRAIN	-5.573	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051	1.051
STRESS	132.095	-23.566	-20.107	-17.397	-10.529	-9.007	-6.603	1.500	2.327	2.400	2.601
TIME=	100.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	320.45	266.44	254.57	243.00	231.50	206.64	190.21	157.05	152.79	152.04	151.44
MICH. STRAIN	-1.144	-0.733	-0.636	-0.554	-0.477	-0.310	-0.200	0.000	0.075	0.000	0.000
PLASTIC STRAIN	-5.701	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040	1.040
STRESS	133.674	-21.513	-10.697	-16.067	-10.004	-9.274	-7.690	1.202	2.229	2.303	2.504
TIME=	100.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	307.42	250.02	207.33	230.19	220.52	200.55	199.15	150.93	152.00	152.04	151.44
MICH. STRAIN	-1.036	-0.672	-0.592	-0.520	-0.459	-0.316	-0.250	0.029	0.071	0.077	0.001
PLASTIC STRAIN	-5.637	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044	1.044
STRESS	130.350	-19.703	-17.021	-15.350	-13.527	-9.352	-7.396	0.077	2.124	2.270	2.394
TIME=	150.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	239.00	246.02	221.74	217.50	214.67	201.95	196.01	163.62	152.91	152.00	151.44
MICH. STRAIN	-0.555	-0.665	-0.429	-0.390	-0.360	-0.200	-0.249	-0.021	0.352	0.050	0.062
PLASTIC STRAIN	-5.153	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026	1.026
STRESS	130.623	-13.710	-12.652	-11.705	-10.756	-0.523	-7.375	-0.629	1.552	1.729	1.850
TIME=	200.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	202.07	207.75	200.95	202.57	199.01	193.44	190.02	165.06	153.24	152.05	151.44
MICH. STRAIN	-0.319	-0.306	-0.226	-0.310	-0.290	-0.205	-0.221	-0.050	0.033	0.001	0.005
PLASTIC STRAIN	-0.970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	1.009	1.009	1.009	1.009	1.009	1.009	1.009	1.009	1.009	1.009	1.009
STRESS	137.065	-10.226	-9.654	-9.159	-8.500	-7.267	-6.550	-1.592	0.976	1.210	1.301
TIME=	250.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	102.51	175.02	142.30	191.05	140.10	146.04	103.06	100.19	153.46	152.09	151.44
MICH. STRAIN	-0.140	-0.271	-0.254	-0.240	-0.236	-0.200	-0.192	-0.370	0.010	0.026	0.031
PLASTIC STRAIN	-0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
STRESS	100.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000

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TIME	400.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	171.32	105.91	104.03	103.03	102.71	170.39	170.46	165.53	154.74	152.36	151.45
MECH. STRAIN	-0.110	-0.219	-0.212	-0.205	-0.197	-0.170	-0.160	-0.070	-0.002	0.013	0.010
PLASTIC STRAIN	-0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302	0.302
STRESS	139.039	-0.505	-0.276	-0.077	-5.046	-5.206	-0.971	-2.320	-0.306	0.398	0.541
TIME	450.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	163.76	170.20	170.52	177.06	172.07	175.17	170.10	160.00	150.60	152.25	151.07
MECH. STRAIN	-0.070	-0.100	-0.170	-0.170	-0.160	-0.155	-0.100	-0.001	-0.310	0.302	0.000
PLASTIC STRAIN	-0.764	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
STRESS	139.317	-5.400	-5.202	-5.157	-0.990	-0.600	-0.300	-2.000	-3.010	0.070	0.220
TIME	000.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.90	170.32	173.70	173.31	172.70	171.37	170.57	163.22	150.70	152.35	151.50
MECH. STRAIN	-0.053	-0.150	-0.154	-0.151	-0.107	-0.130	-0.132	-0.002	-0.020	-0.007	-0.001
PLASTIC STRAIN	-0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.903	0.903	0.903	0.903	0.903	0.903	0.903	0.903	0.903	0.903	0.903
STRESS	139.403	-0.605	-0.303	-0.007	-3.360	-0.303	-3.027	-2.025	-0.700	-0.215	-0.043
TIME	050.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	155.92	170.55	170.10	169.79	169.37	160.35	167.75	162.00	150.00	152.00	151.55
MECH. STRAIN	-0.019	-0.139	-0.136	-0.130	-0.141	-0.120	-0.120	-0.001	-0.031	-0.015	-0.000
PLASTIC STRAIN	-0.732	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955	0.955
STRESS	139.007	-0.131	-0.009	-3.977	-3.091	-3.001	-3.560	-2.393	-0.922	-0.000	-0.202
TIME	500.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	153.93	167.63	167.33	167.06	166.74	165.95	165.49	160.95	150.73	152.52	151.59
MECH. STRAIN	-0.031	-0.125	-0.123	-0.121	-0.119	-0.113	-0.110	-0.070	-0.036	-0.021	-0.015
PLASTIC STRAIN	-0.726	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
STRESS	139.001	-3.711	-3.650	-3.550	-3.520	-3.307	-3.273	-2.307	-1.005	-0.635	-0.007
TIME	550.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	152.00	165.37	165.13	160.92	160.06	160.00	163.67	159.90	150.61	152.50	151.60
MECH. STRAIN	-0.027	-0.110	-0.113	-0.111	-0.109	-0.105	-0.103	-0.077	-0.040	-0.027	-0.020
PLASTIC STRAIN	-0.723	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945	0.945
STRESS	139.729	-3.390	-3.305	-3.302	-3.250	-3.122	-3.007	-2.296	-1.200	-0.793	-0.001
TIME	600.00	INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	151.70	163.50	164.00	163.23	163.02	162.51	162.21	159.10	150.40	152.50	151.00
MECH. STRAIN	-0.025	-0.100	-0.105	-0.100	-0.100	-0.100	-0.097	-0.070	-0.030	-0.011	-0.025
PLASTIC STRAIN	-0.722	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
STRESS	149.761	-3.156	-3.117	-3.001	-3.039	-2.935	-2.870	-2.250	-1.257	-0.920	-0.730

TIME- 650.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 151.22 162.19 162.03 161.89 161.72 161.29 161.38 158.83 158.29 152.59 151.71
 RECH. STRAIN -0.325 -0.100 -0.099 -0.098 -0.097 -0.394 -0.092 -0.074 -0.046 -0.034 -0.328
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.937 0.937 0.937 0.937 0.937 0.937 0.937 0.937 0.937 0.937 0.937
 STRESS 139.760 -2.976 -2.961 -2.912 -2.877 -2.789 -2.739 -2.208 -1.367 -1.022 -0.886

TIME- 700.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.48 161.08 160.92 160.82 160.68 160.31 160.09 157.03 154.12 152.57 151.74
 RECH. STRAIN -0.825 -0.095 -0.094 -0.094 -0.093 -0.090 0.0 0.0 0.0 0.0 0.0
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.934 0.934 0.934 0.934 0.934 0.934 0.934 0.934 0.934 0.934 0.934
 STRESS 139.776 -2.836 -2.806 -2.781 -2.751 -2.676 -2.632 -2.172 -1.619 -1.105 -0.926

TIME- 750.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.59 160.20 160.04 159.97 159.84 159.52 159.33 157.22 153.96 152.54 151.75
 RECH. STRAIN -0.826 -0.092 -0.091 -0.090 -0.089 -0.087 -0.086 0.0 0.0 0.0 0.0
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.932 0.932 0.932 0.932 0.932 0.932 0.932 0.932 0.932 0.932 0.932
 STRESS 139.759 -2.726 -2.701 -2.679 -2.653 -2.587 -2.549 -2.100 -1.658 -1.171 -1.011

TIME- 800.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.42 159.49 159.36 159.29 159.17 158.88 158.71 156.90 153.81 152.51 151.76
 RECH. STRAIN -0.827 -0.089 -0.088 -0.087 -0.087 -0.085 -0.083 -0.071 -0.051 -0.041 -0.036
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.930 0.930 0.930 0.930 0.930 0.930 0.930 0.930 0.930 0.930 0.930
 STRESS 139.736 -2.641 -2.619 -2.603 -2.576 -2.517 -2.483 -2.116 -1.688 -1.224 -1.072

TIME- 850.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.53 158.92 158.84 158.76 158.63 158.37 158.21 156.54 153.67 152.47 151.76
 RECH. STRAIN -0.829 -0.087 -0.086 -0.085 -0.085 -0.083 -0.082 -0.070 -0.051 -0.043 -0.038
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.928 0.928 0.928 0.928 0.928 0.928 0.928 0.928 0.928 0.928 0.928
 STRESS 139.683 -2.575 -2.555 -2.537 -2.516 -2.462 -2.430 -2.091 -1.509 -1.266 -1.122

TIME- 900.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.39 158.67 158.58 158.29 158.20 157.95 157.80 156.29 153.55 152.52 151.76
 RECH. STRAIN -0.830 -0.085 -0.084 -0.084 -0.083 -0.081 -0.080 -0.070 -0.051 -0.044 -0.039
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.927 0.927 0.927 0.927 0.927 0.927 0.927 0.927 0.927 0.927 0.927
 STRESS 139.653 -2.521 -2.502 -2.485 -2.465 -2.415 -2.386 -2.070 -1.523 -1.113 -1.159

TIME- 950.00 INVOLVE MULTI-PASS EFFECT 6 PASS
 TEMPERATURE 150.29 158.30 158.01 157.96 157.84 157.61 157.47 156.01 153.44 152.14 151.76
 RECH. STRAIN -0.830 -0.083 -0.083 -0.082 -0.082 -0.080 -0.079 -0.069 -0.052 -0.045 -0.040
 PLASTIC STRAIN -0.722 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 TOTAL STRAIN 0.926 0.926 0.926 0.926 0.926 0.926 0.926 0.926 0.926 0.926 0.926
 STRESS 139.626 -2.480 -2.463 -2.447 -2.428 -2.381 -2.354 -2.055 -1.536 -1.141 -1.191

TIME- 1000.30		INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.23	157.80	157.72	157.65	157.58	157.51	157.44	157.37	157.30	157.23	157.16
RECH. STRAIN	-0.031	-0.042	-0.042	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041
PLASTIC STRAIN	-0.722	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	139.625	-2.449	-2.432	-2.418	-2.403	-2.388	-2.373	-2.358	-2.343	-2.328	-2.313
TIME- 1000.00		INVOLVE MULTI-PASS EFFECT 6 PASS									
TEMPERATURE	150.23	157.80	157.72	157.65	157.58	157.51	157.44	157.37	157.30	157.23	157.16
RECH. STRAIN	-0.031	-0.042	-0.042	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041	-0.041
PLASTIC STRAIN	-0.722	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STRAIN	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925	0.925
STRESS	139.625	-2.449	-2.432	-2.418	-2.403	-2.388	-2.373	-2.358	-2.343	-2.328	-2.313

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